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Heating Piping & Air Conditioning

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INDUSTRIAL
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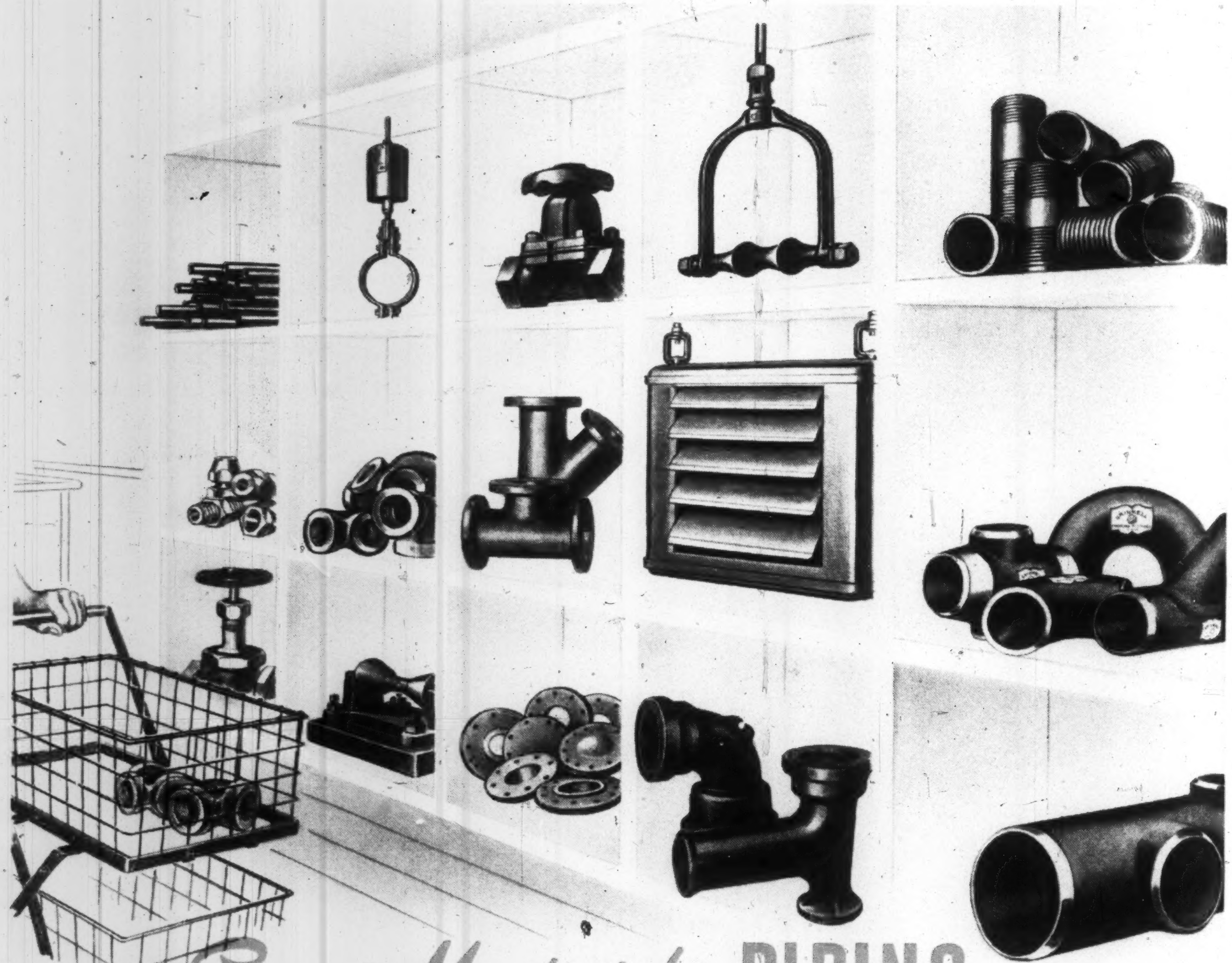

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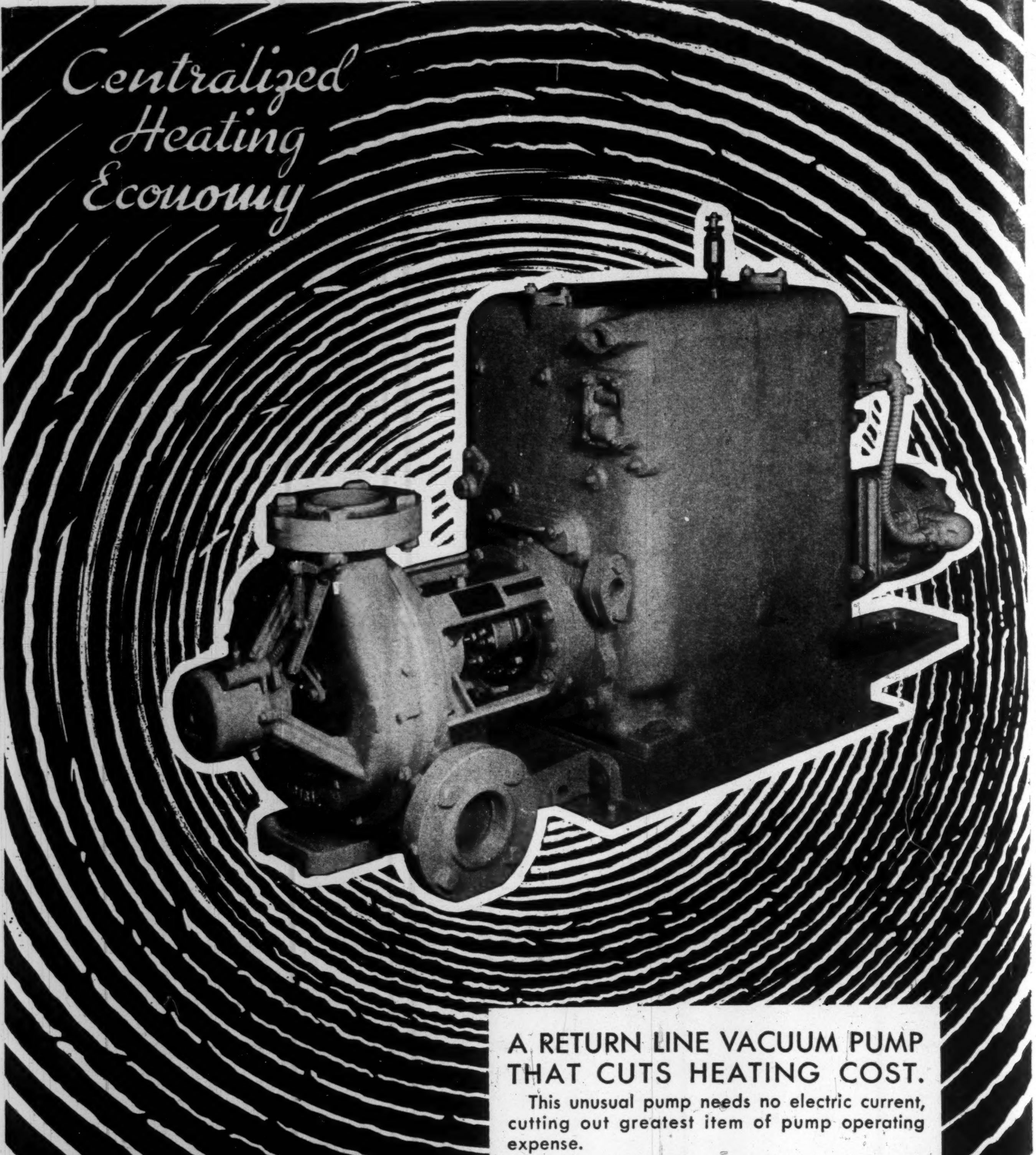

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The most common motive in buying air conditioning is the purely commercial one of profit

Air Conditioning Buyers Know Lots About It That *"Ain't So"*

H. E. WHEELER, president of the Air Comfort Corp., engineers and contractors, Chicago, often feels that almost everything the buying public knows about air conditioning "just ain't so." He reviews here some of the popular misconceptions about air conditioning buying motives, proper temperatures and humidities to maintain, the cost of air conditioning, and the advantages of its use in summer only as compared to year 'round service. Everyone in the air conditioning business will find his easy-to-read article of the greatest practical value

To THOSE OF US in the air conditioning business who deal constantly with the buying public it often seems that almost everything the public knows about air conditioning "just ain't so."

One of the commonest misconceptions is that "the big market" for air conditioning is in the home. Another is that air conditioning is sold only when some well-heeled individual decides that for his own comfort he is going to spend the money to buy air conditioning as a sort of whim or self indulgence. Another idea—a holdover from pioneer days—is that while a man would be a fool not to take steps to keep from being cold in the winter, he is "soft" not to be willing to sweat it out in the summer.

As of today, in the large cities of the northern part of the United States, the most common motive in buying air conditioning is the purely commercial one of profit. Most installations are in commercial and industrial establishments. In all such cases, air conditioning was bought as an investment to make money for the owners. These buyers are often repeat buyers and are well informed about the whole subject. Many, however, are first-time buyers and know almost nothing about air conditioning—except what isn't so; also, there is a noticeable increase in the type of buyer who comes into the market for purposes of his own personal comfort at home. The following remarks are directed primarily to these less informed air conditioning customers.

The conception is widely held that the ideal indoor temperature for air conditioning is a certain number of degrees "below the outside temperature". In fact, it is so common that it is hard to sell equipment on any other basis. The idea arose from the other common misconception that it is unhealthy or dangerous to go from a cool to hot temperature beyond a certain difference, usually said to be 15 F.

A moment's reflection will show that in the winter we think nothing of going from an outside temperature of zero to an inside one of 75 deg—in fact, we rather like to do so, and feel happy when we can. This is a sudden change of 75 deg, five times the mythical 15 deg that has such a hold on public imagination. Also, in the winter, you don't decide what temperature to keep your house at in relation to what the temperature is outside. A man doesn't say to himself, "It's about 40 out today, so we won't want the house warmer than 55." He realizes that in the winter his body soon knows nothing about the outside and feels comfortable only according to the *inside* temperature. The same is true in the summer. After a short time, usually less than 30 min, your own temperature regulating mechanism knows or cares nothing about what was going on outside before you came into the cooled space. The best temperature for you is the one that *you* feel most comfortable in. For offices and places where people are at rest physically, or nearly so, it is generally agreed now that the largest number of people will be best satisfied at 75 F with a relative humidity of 50 percent. (We will come to the humidity question again later on.)

Not everyone will pick the same ideal temperature. Women often are dressed lightly compared to the men in an office and want the temperature slightly higher. And here is an important point: You must decide first whom you are trying to please. Is the air conditioning being run for the benefit of the customers or the help? Don't be too quick to answer that one. If the waiters in a restaurant, because they are doing active physical work, want the temperature about 70 deg, and waiters are harder to get than customers, you may decide to freeze your customers. In fact, it is often done without realizing it. The public then blames air conditioning for the fact that they are too cold, and grumble about when it will finally be perfected. Well, it will be perfected when human beings are perfected and entirely uniform.

As an average, you will be able to please only about 85 percent of the persons involved at the optimum temperature, assuming they are all equally active, or inactive. The others will not be displeased necessarily, but would slightly prefer a higher or lower temperature if given their choice. A few people (sometimes including the boss) just can't ever get warm enough, and they have no sympathy nor understanding for the vast majority who are made decidedly uncomfortable by heat and humidity.

Let's Take Humidity in Two Jumps

It would have been nice if the relative humidity had never been expressed in percent, because it really throws the public for a loss trying to understand it. Let's take it in two jumps, one for the winter and one for the summer.

Winter—In the winter, the relative humidity in most heated spaces is so low that both furnishings and people suffer. There is no earthly use worrying about what would be the ideal humidity in winter because, unless the structure is double glazed, it will not be possible to keep the humidity high enough without having far too much water drip off the windows. Furthermore, many "humidifiers" are hopelessly inadequate—like a spit in the ocean. The average small house or apartment of usual construction needs several *gallons* a day of water evaporated in the coldest weather. Compare that to what you put into radiator pans and you will get the idea. Any real air conditioning system can be equipped to do a job on winter humidity control, but in some types of spaces (display windows in stores, for instance) it is not desirable.

Summer—In the summer, we are of course interested in getting rid of water in the air; there is usually too much of it. For human comfort a correctly sized and designed air conditioning system will produce satisfactory humidity in summer without complicated control. It just so happens that as the temperature goes down, the refrigerating machine uses up more and more of its capacity squeezing moisture out of the air.

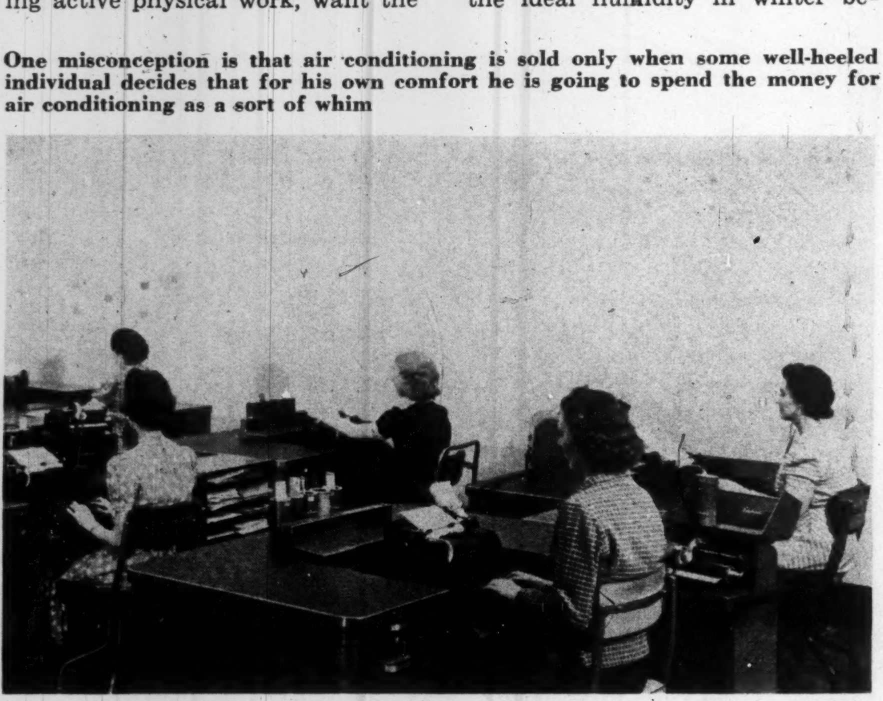
But there are a few confusing terms. One of them is that word "relative" in connection with humidity. When it is very hot outside, say 95 deg, the humidity is commonly quite low, say 40 percent. If that same air were cooled, without taking any water away from it, the *relative* humidity would go up. On such a day, to produce inside temperatures of 75 deg with 50 percent humidity, it is necessary to squeeze out very considerable quantities of water from the air, in spite of the fact that 50 is more than 40—for relative humidity means the percentage of saturation at a certain temperature, and air can hold much more water at higher temperatures.

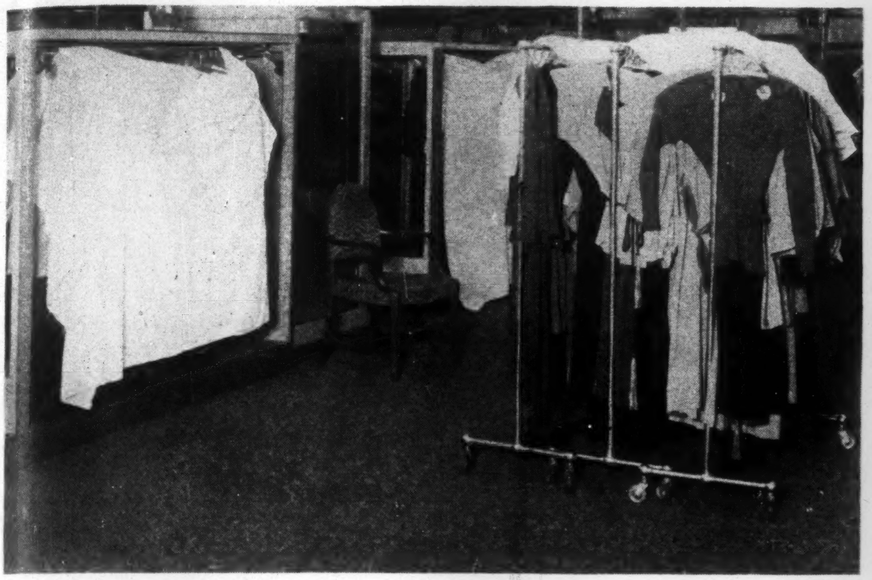
The Cost of Air Conditioning

But for most people who have air conditioning, there is no need to worry about the humidity. There are exceptions, of course, in industry where very exact control is needed for process or storage. And there still are a few theaters using a water spray only to cool the air by evaporation which results in a damp sensation without any great improvement in comfort in many climates.

Another whole series of common

One misconception is that air conditioning is sold only when some well-heeled individual decides that for his own comfort he is going to spend the money for air conditioning as a sort of whim





A store may find that saving on soilage due to dirt alone is enough to justify the air conditioning investment

misconceptions have to do with the general subject of getting something for nothing. Included is the plea that "We don't want a real job; we just want it a little cooler."

Well, there is no such thing as "a little" air conditioning. As long as you have none, you leave doors and windows open and temperatures will usually get not much higher than the outside. *But,* when you close everything up tight, the roof (which may be up to 130 deg or more in the sun) begins to pour in heat that isn't getting out again. The sun streams in through windows. Now there is no limit to what the inside temperature may go, so it is easily possible to have it much hotter with undersized air conditioning than without it.

Incidentally, this may be a good time to mention that it does not always mean that something is wrong if it's hotter inside than out. That will happen if the temperature outside has recently dropped, for instance, and heat is still pouring in from hot masonry, etc. Also, it can well happen that the internal heat in a conditioned space is considerable, in which case the equipment doesn't know much about the outside conditions, and is going along maintaining whatever it is set for—which may be higher than the outside on a fairly cool day.

While air conditioning can't be skimped in size, as mentioned above, it is one of the few cases of mechanical equipment that is better not oversized.

Another idea that dies hard is that the job of cooling a space depends on the cubic content. The size of a room has only a moderate effect on the equipment required. Other factors of equal or even greater importance are windows, and which way they face; roofs exposed to sun; electric lights, including fluorescent, which are just as hot, watt for watt, as other kinds (in fact hotter); people in crowds, and the air needed to keep them from smelling like people.

By the way, we frequently hear about places that haven't been air conditioned because "the engineers can't do it." There is no enclosed space that cannot be conditioned.

Air Conditioning Is Not New

Another perennial is the idea that the equipment will be much cheaper next year. There has not been any revolutionary change in the methods used in this industry since its inception. Air conditioning is not new. It has been in common use at least 25 years. Like all mechanical equipment of similar kind, it has recently gone up in price, but not nearly so much proportionally as the automobile, for instance.

Nontechnical buyers are likely to compare air conditioners to refrigerators. In one case, the equipment is cooling a 6 cu ft, well-insulated box. In the other case the average room is, say, 200 times as large with perhaps no insulation. The very size of the job alone precludes much hope of doing it with something the size of an apple and costing a few dollars. A whole series of improvements and economies in manufacture through the years have tended to decrease the cost of air conditioning so that today it is not much more expensive than before the war. While a $560 automobile has gone to $1600 the prewar single room conditioner has gone up about 20 percent.

At today's prices, the total cost of owning and operating a large office air conditioning system will be paid for at the rate of 25c per day per employee. At today's wages, it is hard to imagine that more than that will not be saved in increased effort and morale.

Year 'Round Use of Air Conditioning

One of the jobs that the air conditioning industry has failed to accomplish in the way of public acceptance is to sell the idea that real air conditioning is of use every day in the year. People still buy to keep cool, but after that buy they find the nine month period that cooling is not needed is at least as great a boon as the three months that it is needed. What they learn is that freedom from dirt, drafts, stale air, dry air, open windows, and outside noises, is so pleasant and habit forming that they would never again willingly be without it, and are inclined to attribute at least half of their total benefits to the so-called off-season use. What is said here of comfort cooling may apply with even greater force to commercial use. A women's ready-to-wear store may find, for instance, that the saving on soilage due to dirt alone is enough to justify the total investment.

Possibly because of the public lack of understanding of the year 'round use of air conditioning, it is fairly common practice for the first-time buyer to fail to do anything about air conditioning for his store or office until warm weather is only a few days away or actually here. He then wants a degree of speed that is not consistent with careful planning. An air conditioning system when purchased will probably be in use 10 years or more (one large installation I know of has been in service for 20 years). It obviously doesn't pay to wait till the last minute to start to do something for the first of 10 summers.

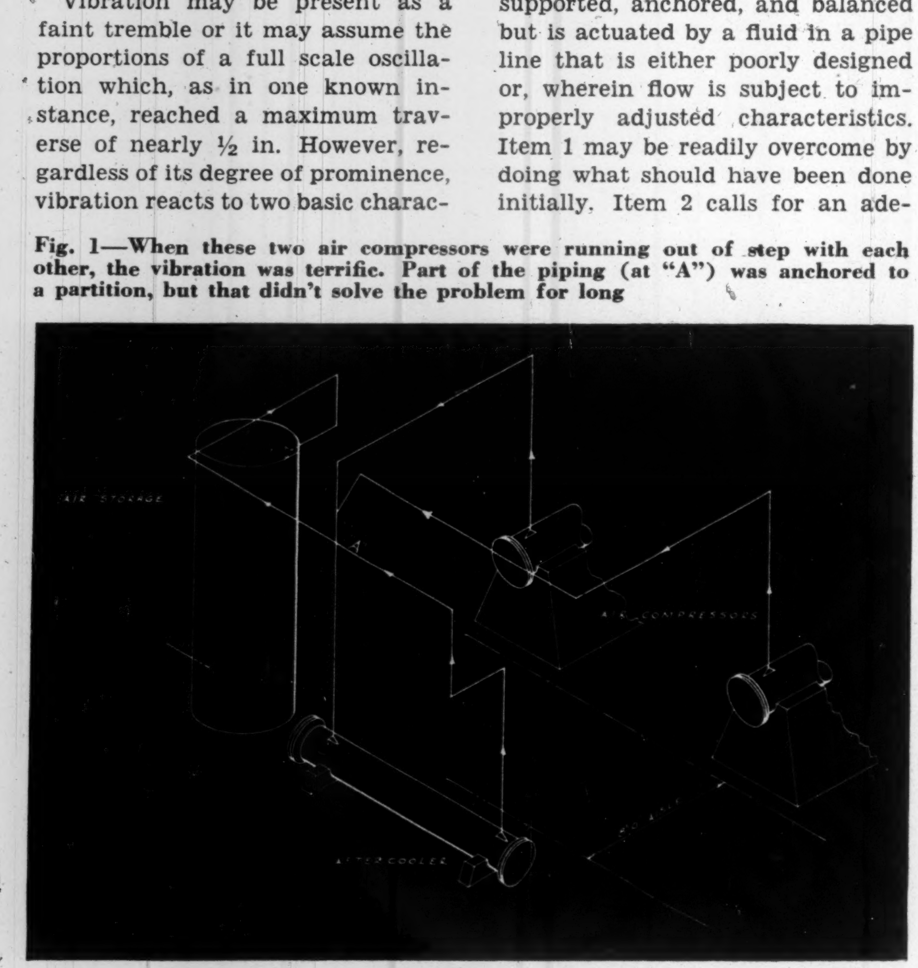
F. E. DAVENPORT, sales engineer, engineering sales section, Crane Co., points out that proper design is the best prevention and cure for vibration in piping systems. He gives an example of a compressed air installation in an industrial plant where trouble arose, and tells how the situation was corrected

VIBRATION in Piping Systems

ONE OF THE most insidious agents of destruction associated with piping systems is vibration. The term "insidious" is applied advisedly because, when present, it is an ever active threat of destruction through fatigue and, as such, becomes an irritant of prime magnitude. The ability to cope with it is an elusive talent.

Vibration may be present as a faint tremble or it may assume the proportions of a full scale oscillation which, as in one known instance, reached a maximum traverse of nearly ½ in. However, regardless of its degree of prominence, vibration reacts to two basic characteristics, namely intensity and frequency. The former indicates the traverse, the latter the number of occurrences per minute. Vibration usually stems from one of four common sources: (1) poorly supported piping; (2) insecurely anchored equipment; (3) equipment running out of balance or eccentric; or (4) equipment which may be perfectly supported, anchored, and balanced but is actuated by a fluid in a pipe line that is either poorly designed or, wherein flow is subject to improperly adjusted characteristics. Item 1 may be readily overcome by doing what should have been done initially. Item 2 calls for an adequate foundation and anchors. Item 3 is a matter of mechanical adjustment while Item 4 may be corrected only by proper engineering.

Fig. 1—When these two air compressors were running out of step with each other, the vibration was terrific. Part of the piping (at "A") was anchored to a partition, but that didn't solve the problem for long



Under Item 4 will be found two types of prime movers, (a) constant flow machines or turbines and (b) reciprocating equipment such as engines, pumps, air compressors, and the like. The former, when properly balanced, seldom set up vibrations in connected piping for the obvious reason that flow is at high speeds and relatively constant. Among the latter, however, are the real offenders and, for the purpose of this article, they become the subject matter.

Reciprocating Equipment

Any reciprocating equipment of the cylinder-piston type must of necessity use flow through valves that open and close alternately. Every time a valve opens, flow starts and it stops, suddenly, with each closing. This action sets up a series of successive shocks or surges which quickly become synchronized with the strokes of the engine. Obviously, this establishes pulsations which, when transmitted to the piping, become vibration. They may happen in either inlet or exhaust piping. In other words, vibration may be an effect of intermittent flow either into or out of reciprocating equipment. It is, therefore, a normal expectancy that vibration frequency will increase or decrease in harmony with the piston strokes per minute. It is also of interest to

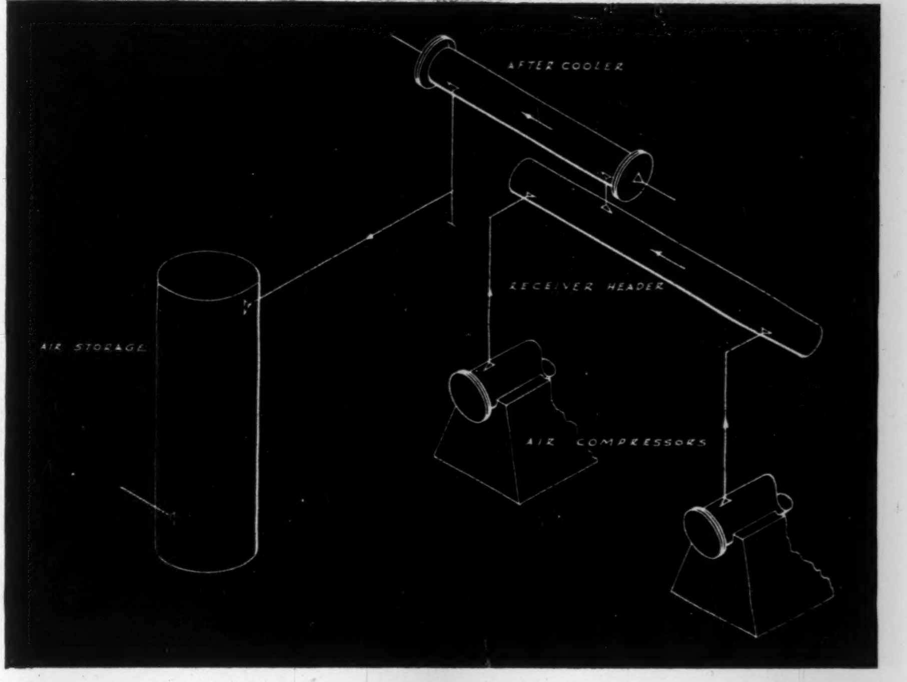


Fig. 2—The vibration situation was corrected by connecting the discharge of the two air compressors as closely as possible to a suitable receiver

note that while the intensity of the vibration lessens or smooths out as frequency increases, it conversely assumes maximum aggravation as the number of piston strokes approaches the minimum.

Improper Design

Fundamentally and commonly, vibration in a piping system may be traced to inadequacies of design. This indictment points to such basic errors as incorrect pipe size, unsuitable velocity, poor layout arrangement and/or lack of beneficial accessories. Velocity is of prime importance. Sensible limits based on good usage have been established for most fluids. Pipe sizes may be too big and thereby set up such a low velocity that surges may be extended far back into the piping. In fact, one actual instance is known where surges from an engine were so strong that the water level in the boilers 200 ft. away rose and fell so violently that it was impossible to get a true level reading in the gage glasses. On the other hand, pipe that is too small will set up a velocity that exceeds the upper limit of the velocity range and so much resistance to flow will be created that friction loss, or pressure drop, will be excessive. Turbulence may develop because a pipe bend was formed on too long a radius or the actual layout of the system itself may be an invitation for the piping to "flop all over the place."

Naturally, vibration in a piping system is unwelcome. In addition to being something to be rid of, its presence perpetuates a fear that, at some unpropitious moment, fatigue will overcome the elastic limit of the piping materials and failure will occur, with disastrous results. Consequently, many theories of relief have been proposed and some have been tried with varying degrees of success. One school of thought suggests that affected piping may be held so tightly by directly applied clamps or anchors that it just can't move. Another accepts the theory that counterbalances or dampeners are the only effective controls, while still another follows the concept that pneumatic snubbers or spring loaded piston type shock absorbers will do the job.

Actually all of these measures are palliative, not curative. For just so long as the force remains as such, even though restrained, just so long will the effort to vent itself continue and the probability of failure endure. In spite of all efforts to inhibit, restrain, clamp, anchor, balance, snub, dampen, absorb, combat, and the like, vibration cannot be permanently stopped by mechanical means. It is significant that if there remains so much as the tiniest wiggle, it will eventually prevail and return to do business at the old stand and at the original intensity.

Vibration, like any other complex problem, is best treated by approaching the problem along the age old avenue of commonsense. If you have an effect that does not suit, then the logical procedure is to revise the cause. In this instance, the solution lies in the act of stopping the surge. The key to the answer is velocity. A sudden radical lessening of velocity will dissipate the surge. To accomplish this, a suitable surge tank, or receiver, is placed in the affected pipe line, the purpose of which is to kill the pulsations before they can be converted into vibration.

Use of Receivers

Emphasis must be placed on the precise location of this receiver. Frequently receivers are installed in any convenient place in a line.

Correctly, they should be placed as close to the engine throttle valve, or point of usage, as is possible. In fact, no receiver at all is better than one improperly placed. In inlet or supply piping, surge is a result of reversal of flow caused by the opening and closing of the engine valve. If this receiver is not directly connected to the engine throttle valve, or very close to it, but is attached by piping, then any good done by it may be dissipated because this intervening length of pipe may restore the original surge, the degree of restoration depending upon the length and layout of this connecting piping. In an exhaust line, if the receiver is not directly connected to the engine exhaust port, then the likelihood of vibration will be present in fair proportion to the length of the connecting piping. Here, too, no receiver is better than one remotely connected. In either case, this receiver or surge tank should be dimensioned so that it is well proportioned for appearance and of a capacity at least four times the cubical content of the total cylinder capacity to which it is connected. It is best fabricated with the inlet and outlet pipes extended a reasonable distance within the receiver and so placed that flow cannot maintain its velocity by cutting straight through without the intended benefit of the reduction in velocity. These extensions also serve as a trap for any condensate which may be then drained off from it.

When receiver size and location have been fixed, then pipe sizes and layout should be checked. Velocity should be high enough to keep the receiver adequately filled with fluid and pipes as short as consistent with good design.

The use of a receiver or surge tank is highly recommended in connection with any reciprocating equipment, such as engines, pumps, and compressors, where the fluid or fluids involved may be compressed. When the service is hydraulic, surge with its resulting water hammer may also be handled through the use of a surge tank provided the upper half of it is filled with air compressed to the equal of the pressure of the hydraulic fluid. This will serve as a cushion or shock absorber and smooth, steady flow will result. In any event, surge will be arrested and vibration precluded.

Air Compressor Example

To cite an example, an eastern industrial plant required a large volume of compressed air. To supply this demand, an air compressor was installed and later, as the load increased, a second compressor was added in a parallel position about 5 ft. away. (see Fig. 1.) This combined unit was complete with a closed aftercooler and a vertical receiver. Five-inch leads from the compressors were combined to make one 5 in. inlet into the aftercooler and from there to the receiver. It happened that space was so limited that it was necessary to locate the aftercooler and the receiver about 8 ft. in front of the compressors. Unfortunately, an aisle passed between the two sections of this installation making it necessary to bridge this aisle with the piping in order to reach the aftercooler resting on the floor. This piping was unsupported.

The two compressors were of different cylinder sizes and were running at different speeds. When they were running out of step with each other, the piping vibrated quite badly but when they got in step, which happened frequently, the vibration was terrific. Part of this piping (see "A" in Fig. 1) was installed parallel to a partition and was anchored to it in the hope that this would quiet the operation. For a relatively short time, vibration was fairly mild but finally that infinitesimal residual wiggle that could not be entirely removed began to work slowly back to its original intensity. Soon it arrived and the partition became a total loss . . . with the vibration as bad as ever.

As in steam piping, velocity plays an important part in the design of piping for compressed air, friction loss being the controlling factor. Pipe sizes too small boost pressure drop and increase temperature while sizes too large, seemingly ideal because of their diminishing friction losses, have a tendency to develop air impact due to slow velocity.

In this installation, a quick check of piping calculations revealed that the pipe size was a little too big for good flow conditions. In other words, the velocity was too slow but this was not considered as being too serious, however, in view of the rather rambling layout of the piping. Applying the theory that this vibration was the direct result of maladjustment of flow and piping characteristics, it was recommended that the discharge of these compressors be connected as closely as possible to a suitable receiver (see Fig. 2). Flow from the receiver was directly, on a close couple, into the aftercooler and from it to the storage tank. Fig. 2 shows the additions to and revisions in the old piping. The new receiver is as close to compressor outlets as conditions permit. In prescribing its shape, a length was assumed that would couple both compressor outlets into a common header. Once the length was established, the diameter was only a matter of mathematics in relation to the volume desired.

Under this new arrangement, air passes from the compressors into the common receiver-header where all pulsations are dissipated by the suddenly reduced velocity. Flow from the receiver to the storage tank is again accelerated but the action is uninterrupted and quiet. Troublefree service for more than a year attests the validity of the corrective design.

TAKE IT EASY WHEN VISITING EXHIBITION

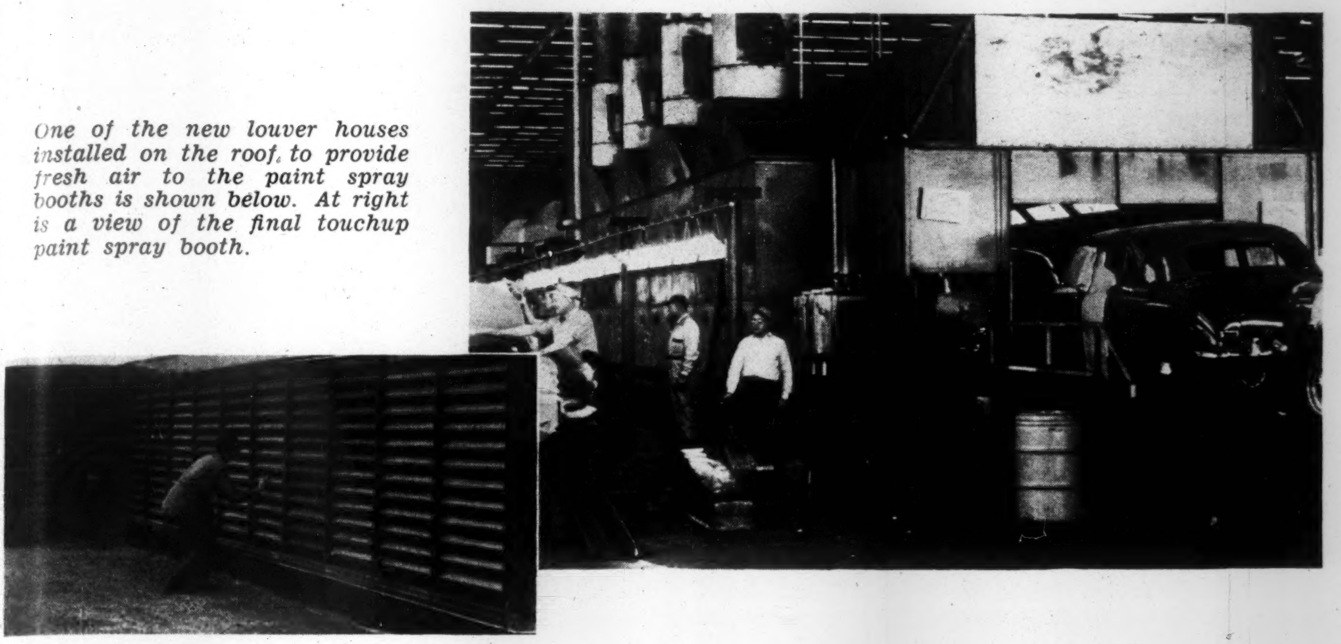
The manner in which the question published in November (about how best to visit a large exposition) is put involves part of the answer. The question makes it a condition that the visitor to an exposition should not miss anything which might be of interest to him. In this case the visit is a serious event, and you may be sure that you leave tired and possibly disappointed.

An exposition serves a double purpose—to satisfy special interest and to please. The first condition in order to get through successfully is to take it easy and to keep your eyes open without the strain of gazing 'round like a boy without experience. Do not bother about possibly missing something. If you find out later that you did, you might easily obtain information through the usual channels of correspondence or calls. Prepare your program before you start, but make it short to leave time for improvisations.

You are engaged in problems and anxious to contact manufacturers for assistance. They may (these days) be reluctant to interest themselves in new questions if you approach them by writing. In the case of an exposition you will find them different and all at your service. They listen to your case, discuss it with you, and the issue will mostly be positive, since the exhibitor comes to an exposition not only to show what he has accomplished, but also to learn more about the requirements of the market.

When you steer toward the few exhibits which are your target for the day, you cannot help looking at the booths between. They are of two types, one stressing details of design, the other appealing to your artistic vein. Blink on the first and enjoy the second as a triumph of the art to which you are devoted.

After you get through your program, start a new round—this time strolling without intention. If you would try not to miss things which might be of interest to you, you would need know what possibly can have been exhibited. If you do know, the exposition is a failure, lacking surprising novelties. After visiting an exposition you are supposed to have gained new information unexpectedly. There is hardly a way to anticipate such novelties and to include them in your program beforehand. You risk less to miss them, when you keep fit by not caring too much.—M. H.



One of the new louver houses installed on the roof to provide fresh air to the paint spray booths is shown below. At right is a view of the final touchup paint spray booth.

AUTOMOBILE PRODUCTION AT WILLOW RUN

Providing Additional Make-Up Air at Huge Plant

ENTRY OF THE KAISER-FRAZER CORP. into the automobile field and the conversion of the huge B-24 bomber plant at Willow Run, Mich., has presented many plant engineering problems. Of particular interest to heating and ventilating engineers has been the need for additional make-up air facilities, necessary for an air balance during winter operation, and the development of suitable alterations to the heating and ventilating system to provide for this deficiency.

The main manufacturing building of the Willow Run plant is one story, with mezzanine and second floors in certain locations; in general, the first floor space is used for manufacturing and assembly. The manufacturing and assembly sections of the building are heated by warm air distributed throughout the working area by ductwork from 69 heater rooms.

Each heater room consists of a fresh air intake, self cleaning air filters, nonfreeze steam coils, fan, and motor. Mixing dampers at the intake louvers are thermostatically controlled to maintain a constant temperature of mixed air at the entry to the steam coils. Steam control valves and bypass dampers at the coils are provided for constant temperature of air entering the distribution ductwork. All controls are actuated by a pneumatic system.

Steam Piping to Heater Rooms

Steam is supplied to the heater rooms at 35 lb gage from steam lines in the truss space. These lines are fed by risers from the medium pressure steam main in the pipe tunnel (under the first floor) which connects the building with the power house.

The power house has four boilers each with a capacity of 80,000 lb per hr of steam at 240 psig and 450 F. (The original design included space for a fifth boiler; however, this extra steam capacity had not been required until the present time). A high pressure (240 psig) header collects steam from the four boilers. This header is connected to an 18 in. main in a tunnel connecting the power house with the main manufacturing building. Two extraction turbines for two turbo-generator sets are supplied by branches from this high pressure header and medium pressure steam for the building heating units is extracted from these turbines at 40 psig. To supplement medium pressure steam during heavy heating loads, reducing stations are installed between the high pressure and medium pressure

ROBERT L. GETTS, engineer, plant engineering dept., Kaiser-Frazer Corp., describes here the necessity for providing additional make-up air facilities when the wartime bomber plant at Willow Run was converted to automobile production. He summarizes the various methods considered—eight in all—with data on the cost and other advantages and disadvantages of each of the schemes. Plant heating, ventilating, air conditioning, and piping services are closely tied to the manufacturing processes in factories, and changes in plant operation require study and revision of these services.

Table 1—Types of Exhaust Systems for Manufacturing Automobiles at Willow Run

Types of Exhaust Systems	*cfm*
Paint spray booths	1,002,000
Body manufacturing (lead fumes, lead and steel grindings, and bonderizing)	139,000
Automobile engine exhaust fumes (car starting area, tuning rolls, and dynamometer)	80,000
Paint drying ovens	72,000
Miscellaneous (paint mixing room, frame washer, etc.)	66,000
Total	1,359,000

Table 2—Summary of Supply and Exhaust Condition During the Winter of 1946-47

Supply (neglect infiltration)	*cfm*
Building heater units	1,560,000
Offices, first aid stations, etc	45,000
Total	1,605,000
Exhaust	
Roof ventilators	2,870,000
Toilets, offices, etc	336,000
Paint spray booths	1,002,000
Body manufacturing (lead fumes, lead and steel grindings, and bonderizing)	139,000
Automobile engine exhaust fumes (car starting area, tuning rolls, and dynamometer)	80,000
Miscellaneous (paint mixing room, frame washer, etc.)	66,000
Total	4,493,000

Excess exhaust = 2,888,000 cfm

headers. These stations open automatically when the steam pressure in the medium pressure header falls below 37 psig.

Possession of the Willow Run plant was taken by Kaiser-Frazer and Graham-Paige Motors Corp. in November 1945. Work was immediately begun on converting the plant from the production of airplanes to that of automobiles and by June 1946 the first automobile had rolled off the No. 1 assembly line. Increased facilities have taken shape rapidly and production has increased to more than 18,000 cars a month from the two assembly lines.

More Air Removal Required

This conversion has consequently necessitated the removal of more air from the building than had been previously required. This can be readily understood when it is realized that more than 950 ft of spray painting booths and more than 4300 ft of paint drying ovens have been installed for the operation of two assembly lines and that the contaminated air generated from these operations as well as from other sources has been exhausted directly to the outside. More than 1,359,000 cfm of exhaust systems have thus been installed.

Table 1 shows the various types of exhaust systems that have been required at Willow Run for the manufacture of automobiles.

The air balance was further disturbed when it became apparent that roof ventilators would have to be maintained in operation during the winter season to eliminate fumes from the paint drying ovens. Since exhausts from the ovens to the outside had not yet been installed during the winter of 1946-47, it was required to operate nearly all of the roof ventilators to keep the working areas free of these fumes. Difficulties in heating were experienced near the outside walls where infiltration due to the excessive exhaust condition caused drafts in certain areas. This was alleviated by constructing temporary barricades in these locations.

Table 2 gives a summary of the supply and exhaust condition for average winter operation during 1946-47.

In order that the amount of air that was being discharged by roof ventilators might be reduced (the original designed heat load did not

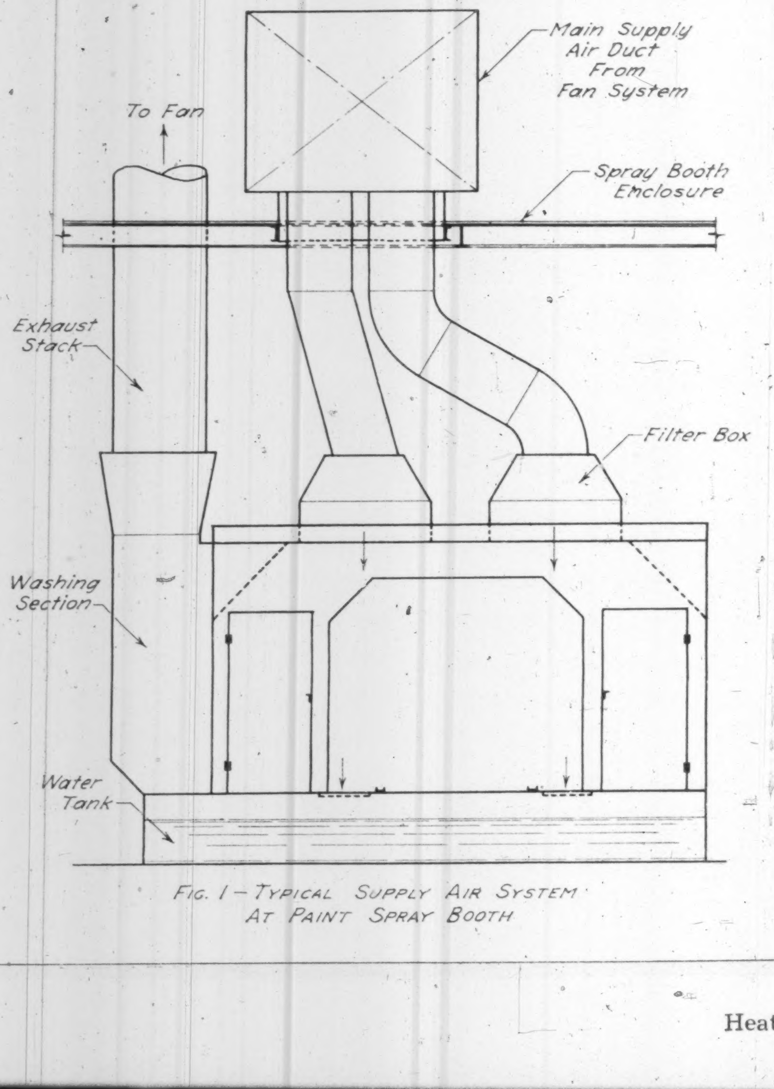


Fig. 1—Typical Supply Air System At Paint Spray Booth

Table 3—Spray Booths Provided with Air Supply Systems

	cfm
Sealer coat paint spray booths	150,000
Final coat paint spray booths	300,000
Repair paint spray booths	60,000
Two-tone paint spray booths	60,000
Final touch-up paint spray booths	120,000
Total	690,000

include the operation of all ventilators during the winter), exhaust stacks were installed from the paint drying ovens to the outside to remedy the fume condition. This removal of fumes at their source has thus eliminated the need for operating all of the roof ventilators during the winter season and it is estimated that a saving of more than 1,885,000 cfm will be realized because of this improvement.

Outside Air Supplied to Spray Booths

More than half of the spray booths installed in the plant were provided with air supply systems (Table 3 and Fig. 1). These supply systems circulated air from the building through filters into the working areas of the booths where it was exhausted to the outside by the spray booth exhaust systems. To eliminate the removal of this air from the building, modifications were made in order that air from the outside would be supplied to the spray booths. This was accomplished by extending the existing supply air housings to new louver houses on the roof and by installing steam coils for heating the outside air from 0 to 85 F. Medium pressure steam lines were installed from the medium pressure main in the tunnel to the heaters.

Fig. 2 shows how this was accomplished at a typical paint spray booth air supply system.

To make up the remaining 385,000 cfm required for balanced ventilation, certain building heater units were modified to handle all outside air by increasing the size of the steam piping and control valves feeding the coils. The control systems were also modified so that recirculation would start at outside temperatures below 0 F, and as a precaution against freezing (there are no preheating coils) low limit thermostats were installed in the air stream so that the fresh air dampers will close and the recirculating dampers will open sufficiently to maintain 85 F air temperature at the fans. Since the recirculated air intakes at the heater units were located high in the building where fumes collected, those units altered for outside air were selected at areas where fumes would be at a maximum and concentration of employees high. The medium pressure

Table 4—Summary of Supply and Exhaust Systems, After Alterations, for Average Winter Operation

	cfm	Comments
Supply (neglect infiltration)		
Building heater units	1,945,000	Certain units were modified in order that they would handle 100% outside air above 0 F.
Spray booth make-up air units	690,000	Spray booths with air supply systems were altered in order that they would handle 100% outside air above 0 F.
Offices, first aid stations, etc	45,000	
Total	2,680,000	
Exhaust		
Roof ventilators	985,000	The installation of exhaust stacks from the paint drying ovens eliminated the need of operating all of the roof ventilators.
Toilets, offices, etc	336,000	
Paint spray booths	1,002,000	
Body manufacturing (lead fumes, lead and steel grindings, and bonderizing)	139,000	
Automobile engine exhaust fumes (car starting area, tuning rolls, and dynamometer)	80,000	
Paint drying ovens	72,000	Exhaust stacks were installed at the ovens to discharge fumes from the ovens directly to the outside.
Miscellaneous (paint mixing room, frame washer, etc.)	66,000	
Total	2,680,000	

Table 5—Heat Load for the Main Manufacturing Building of the Willow Run Plant

(Compiled by Kaiser-Frazer plant engineering dept.)

Part of building and material	*Area Sq Ft*	*Coefficient of transmission*	*Btu/deg diff./hr*	*Temp. diff. 0 F outside*	*Btu loss per hr*
LOSSES BY TRANSMISSION					
North elevation					
12″ brick	46,350	0.36	16,700	70	1,170,000
8″ brick	30,218	0.50	15,100	70	1,060,000
2″ gunite	39,266	0.82	32,200	75	2,420,000
glass	42,330	1.13	47,800	75	3,580,000
South elevation					
12″ brick	53,797	0.36	19,400	70	1,360,000
8″ brick	7,710	0.50	3,900	70	270,000
2″ gunite	54,496	0.82	44,700	75	3,350,000
glass	35,959	1.13	40,700	75	3,060,000
150′ doors	9,438	1.00	9,400	75	700,000
East elevation					
12″ brick	14,567	0.36	5,200	70	360,000
8″ brick	3,071	0.50	1,500	70	100,000
2″ gunite	25,230	0.82	20,700	75	1,550,000
150′ doors	9,430	1.00	9,400	75	700,000
glass	12,472	1.13	14,100	75	1,060,000
West elevation					
12″ brick	32,434	0.36	11,700	70	820,000
glass	12,416	1.13	14,000	75	1,050,000
Roof skylights and fan rooms					
2″ gunite	142,420	0.82	117,000	80	9,360,000
glass	25,690	1.13	29,100	80	2,330,000
Roof					
Metal deck, rigid insulation, & tar & gravel roofing	2,650,000	0.24	636,000	85	54,100,000
LOSSES BY INFILTRATION (One air change per hour)					
Volume × coeff. = 105,406,520 cu ft × 1/55.2			1,910,000	75	143,000,000
LOSSES BY MATERIAL AND TRANSPORTATION					
(100 cars/hr/4,000 lb per car = 400,000 lb/hr plus 800,000 lb/hr allowance for trains & trucks) 1,200,000 lb × 0.12 Btu/lb/deg			144,000	70	10,100,000
LOSSES BY VENTILATION					
Roof ventilators, etc. 1,321,000 cfm				85	122,000,000
Paint spray booths, etc. 1,359,000 cfm				70	103,500,000
				Total heat loss	467,000,000

Table 6a—Comparison of Various Methods Considered for Providing Balanced Heating and Ventilation at Willow Run Plant of Kaiser-Frazer Corp.
(Compiled by Kaiser-Frazer plant engineering dept., and Albert Kahn Associated Architects and Engineers, Inc.)

Scheme	Fuel or heating medium	Air supply	Fuel storage proposed	Gal of fuel required to heat additional amount of supply air to provide balanced vent. (16 hr operation) 0 F weather	20 F weather	Gal of existing fuel use
1. Direct fired heaters	Propane	Outdoor	No additional	9,000	7,000	18,000
2. Direct fired heaters.....	Propane	Outdoor	150,000 gal	9,000	7,000	18,000
3. Indirect fired heaters ..	Propane	Outdoor	150,000 gal	13,000	10,000	18,000
4. Indirect fired heaters ..	No. 3 fuel oil	Outdoor	No additional Use three of 16 existing 30,000 gal fuel oil storage tanks.	8,500	6,500	None
5. Indirect fired heaters ..	No. 3 fuel oil	Outdoor	120,000 gal	8,500	6,500	None
6. Indirect fired heaters ..	Bunker C fuel oil	Outdoor	No additional	7,850	6,000	62,500
7. Steam heating .... Additional steam supply and distribution would be provided to existing building heating units to furnish adequate air to plant.	Bunker C fuel oil	Building air	No additional	6,700	5,100	62,500
8. Steam heating .... Additional steam supply, distribution, coils, and housings would be provided to supply heated outdoor air direct to spray booths.	Bunker C fuel oil	Outdoor	No additional	6,700	5,100	62,500

Table 6b—Comparison of Various Methods Considered for Providing Balanced Heating and Ventilation at Willow Run Plant of Kaiser-Frazer Corp.
(Compiled by Kaiser-Frazer plant engineering dept., and Albert Kahn Associated Architects and Engineers, Inc.)

Scheme	Gal of fuel storage capacity Existing	Total proposed	Days of fuel storage capacity (16 hr operation) Proposed use 0°	20°	Existing use Existing facil.	Installation cost based on Scheme 1 as unity
1......	150,000	150,000	5.5	6.0	8.3	1.0
2......	150,000	300,000	11.1	12.0	8.3	1.6
3......	150,000	300,000	9.7	10.7	8.3	2.2
4......	90,000	90,000	10.6	13.8	Proposed 6.2 Existing 7.7	1.7
5......	None	120,000	14.1	18.5	7.7	1.9
6......	480,000	480,000	6.8	7.0	7.7	1.8
7......	480,000	480,000	6.9	7.1	7.7	1.6
8......	480,000	480,000	6.9	7.1	7.7	1.7

Table 6c—Comparison of Various Methods Considered for Providing Balanced Heating and Ventilation at Willow Run Plant of Kaiser-Frazer Corp.
(Compiled by Kaiser-Frazer plant engineering dept., and Albert Kahn Associated Architects and Engineers, Inc.)

Scheme	Daily fuel cost to heat additional amount of supply air to provide balanced ventilation 0 F weather	20 F weather	Time required to make installation
1.........................	$630	$490	60 days
2.........................	$630	$490	60 days for burners 90 days for tanks
3.........................	$910	$700	120 days for heaters 90 days for tanks
4.........................	$720	$550	120 days
5.........................	$720	$550	120 days
6.........................	$590	$450	120 days
7.........................	$500	$390	180 days
8.........................	$500	$390	180 days

steam lines in the truss area that supplied the heater units were not of sufficient size in some sections to handle the added quantity of steam required for this increased heating load; thus, it was necessary to augment the overloaded sections of the heating main by installing risers from the high pressure main in the tunnel to reducing stations in the truss space feeding these medium pressure lines.

Table 4 gives a summary of the supply and exhaust systems after modifications were made in obtaining balanced ventilation for average winter operation. The resulting heat load for the building is given in Table 5.

Steam, Propane, Oil Fired Heating Units Studied

Since the heating capacity of the plant facilities was inadequate to heat the additional supply air required, the choice of heating by steam and the installation of a new 80,000 lb per hr boiler to accomplish this was made only after a complete study of the various possible uses of steam, propane fired, and oil fired heating units. A propane storage and handling system with a rated vaporizing capacity of 800 gph had been installed at the plant for operation of the paint drying ovens but there was no fuel oil distribution system available in the building. Since there was an existing steam main with surplus capacity in the vicinity of the final touch-up paint spray booths, in all schemes it was considered that these booths would handle all outside air and be heated by steam.

The following eight schemes were studied.

Scheme 1—Install direct fired propane air heaters for spray booth air supply units taking all air from outdoors. Install steam heated air supply units for final touch-up paint spray booths taking all air from outdoors. Make general steam piping and control changes to enable building heater units to handle more air from outdoors within the capacity of the existing boilers. Provide additional propane vaporizing equipment and piping.

Scheme 2—Same as Scheme 1. Install an additional 150,000 gal of propane storage capacity.

Scheme 3—Same as Scheme 2 except air heaters would be indirect fired rather [illegible]ect fired propane air heat[illegible]

Scheme 4—Install indirect fired No. 3 fuel oil air heaters for spray booth air supply units taking all air from outdoors. Install steam heated air supply units for final touch-up paint spray booths taking all air from outdoors. Make general steam piping and control changes to enable building heater units to handle more air from outdoors within the capacity of the existing boilers. Install fuel oil distribution lines and pumps to heaters from the power house tank farms. Storage capacity in the amount of 90,000 gal would be "borrowed" from the existing 480,000 gal of bunker C storage for the power house. No additional storage capacity would be provided.

Scheme 5—Same as Scheme 4. Install an additional 120,000 gal of buried fuel oil storage.

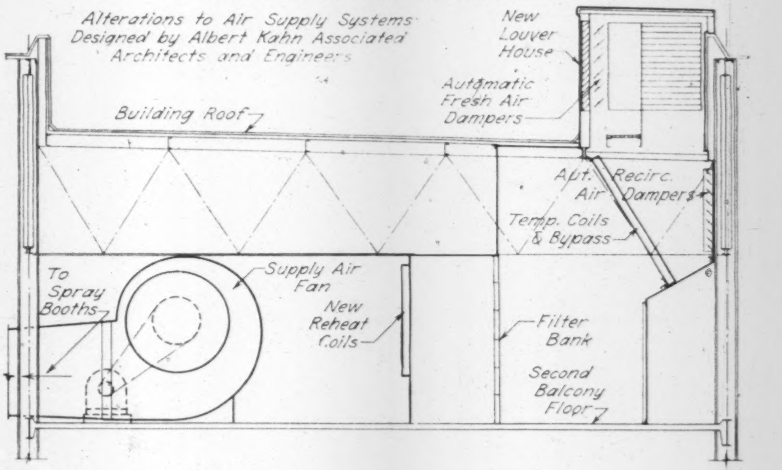
Scheme 6—Same as Scheme 5 except fuel would be bunker C oil and installation of fuel lines would require line heaters, and burners would require heaters and auxiliary fuel for lighting off.

Scheme 7—Install an additional 80,000 lb per hr boiler in the power house. Provision was made in the original power house design for future installation of an additional boiler. Foundation, steam header, valves, etc., were installed and would be available. Install additional steam distribution lines and controls to the existing building heater units to enable them to supply sufficient heated air to balance the ventilation load. Spray booth air supply units would continue to take air from the plant but would be provided with ductwork to lower the air intake levels since the original intake levels, located high in the building, skim off hot, contaminated air from under the roof.

Scheme 8—Same as Scheme 7 except make alterations to the existing air supply units to take air from outdoors directly to the spray booths, together with the necessary piping, heating coils, louver houses, and ductwork.

Tables 6a to 6d give a comparison of the installation costs for the various methods considered. Information is given regarding fuel consumption and storage facilities, daily fuel costs, time required to make the installation, and comments regarding the advantages and disadvantages of each scheme.

FIG. 2 — TYPICAL SPRAY BOOTH AIR SUPPLY SYSTEM SHOWING ALTERATIONS REQUIRED TO PROVIDE OUTSIDE AIR TO SPRAY BOOTH

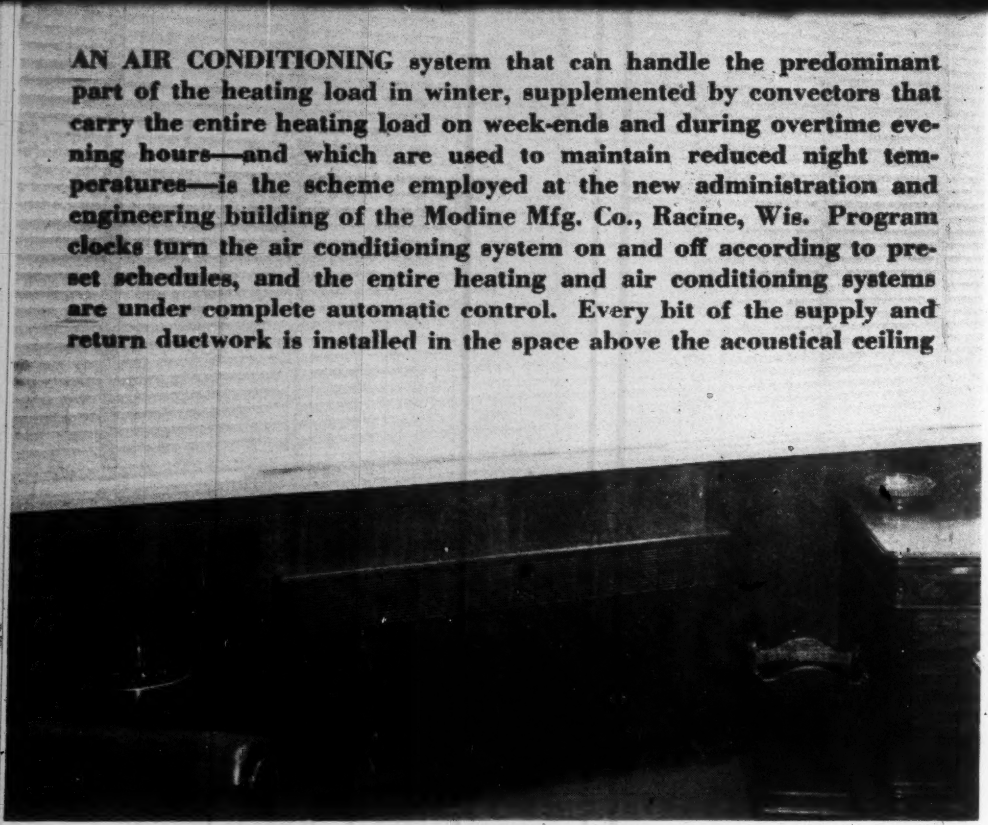


Alterations to Air Supply Systems Designed by Albert Kahn Associated Architects and Engineers

Table 6d—Comparison of Various Methods Considered for Providing Balanced Heating and Ventilation at Willow Run Plant of Kaiser-Frazer Corp.

(Compiled by Kaiser-Frazer plant engineering dept., and Albert Kahn Associated Architects and Engineers, Inc.)

Scheme	Advantages	Disadvantages
1.	Lowest cost for installation. Provides direct outdoor air supply. Minimum floor space. Maximum efficiency. Maximum flexibility. Low maintenance cost.	Inadequate fuel storage. Fire hazards of direct fired heaters. Possible contamination of air supply to spray booths. Fire hazards and possible contamination thought to be of minor nature.
2.	Low cost for installation. Provides direct outdoor air supply. Minimum floor space. Maximum efficiency. Maximum flexibility. Low maintenance cost.	Fire hazards of direct fired heaters. Possible contamination of air supply to spray booths. Both conditions thought to be of minor nature.
3.	Provides direct outdoor air supply. Good flexibility. Low maintenance cost.	Highest cost for installation. Lowest efficiency and highest fuel cost. Requires more floor space, extra flues through roof, and additional power load for fans.
4.	Low installation cost. Provides direct outdoor air supply. Fuel may be more readily available than propane. Low maintenance cost.	Reduces present fuel oil storage capacity. Lower efficiency. Takes more floor space, extra flues through roof, extra power load for fans. Control more difficult due to lack of flexibility.
5.	Medium installation cost. Provides direct outdoor air supply. Fuel may be more readily available than propane. Low maintenance cost.	Lower efficiency. Takes more floor space, extra flues through roof, extra power load for fans. Control more difficult due to lack of flexibility.
6.	Medium installation cost. Lower cost of fuel. Operates from same storage as power house. Provides direct outdoor air supply.	Reduces present fuel oil storage capacity. Lower efficiency. Takes more floor space, extra flues through roof, extra power load for fans. Fuel lines through plant must be heated. Fuel oil heaters required at each burner. Control more difficult due to lack of flexibility. Probable highest maintenance cost.
7.	Low installation cost. Major construction operations confined to the power house. Maximum flexibility of control. Maximum cleanliness. Elimination of fuel piping in plant. Lowest fuel and maintenance cost. Installation provides some excess capacity for future expansion.	Long delivery of equipment. Does not provide flexibility in temperature of air supply to spray booths for summer operations, since supply is taken from the building.
8.	Low installation cost. Maximum flexibility of control. Maximum cleanliness. Elimination of fuel piping in plant. Little floor space taken up in plant. Lowest fuel and maintenance cost. Installation provides some excess capacity for future expansion.	Long delivery of equipment.



AN AIR CONDITIONING system that can handle the predominant part of the heating load in winter, supplemented by convectors that carry the entire heating load on week-ends and during overtime evening hours—and which are used to maintain reduced night temperatures—is the scheme employed at the new administration and engineering building of the Modine Mfg. Co., Racine, Wis. Program clocks turn the air conditioning system on and off according to preset schedules, and the entire heating and air conditioning systems are under complete automatic control. Every bit of the supply and return ductwork is installed in the space above the acoustical ceiling

Convection Heating, Air Conditioning Combined in New Building

CONVECTION HEATING and air conditioning are combined in the new administration building of the Modine Mfg. Co., Racine, Wis. The unusual scheme is said by the owner to result in a number of advantages. Either the convectors installed on the outside walls (and supplemented by cabinet unit heaters in interior areas), or the air conditioning system can handle the building's winter heating load during the greater part of the heating season. The building can thus be warmed up before occupancy in the morning, held at above-freezing temperatures at night or over week-ends, or at comfortable working temperatures during overtime evening or week-end hours, without the air conditioning equipment being placed in operation. Operation is under complete program clock control, shutting down the air conditioning system at night and over week-ends and starting it up again.

During the working day, the installation might be said to be a "modest" split heating system. At this time, the air conditioning system is the "master", being supplemented by the convectors when necessary. The convectors are supplied with water from a convertor, the water temperature being low (120 to 140 deg) on a normal winter day.

Benefits of the method are stated to be increased comfort for the occupants, the reduced operation of the air conditioning system, and (consequently) less maintenance required. The increase in first cost of the installation was "moderate" as compared with a straight air conditioning job. While the owner would naturally be expected to employ convectors for heating its own building, the type of system selected for this structure was based on a strict engineering analysis of the requirements to be met.

Modern in Styling

The new administration building—attractively modern in structural as well as interior styling—is of one story construction, extending 185 ft across the front. It has approximately 65,000 sq ft of floor area.

The lobby is done in wood paneled walls with terrazzo floor, with a liberal use of aluminum and glass trim. The directors' room and several of the private offices are paneled in walnut, while other private offices (together with the main office area) are finished in soft tones of blue, yellow, and gray.

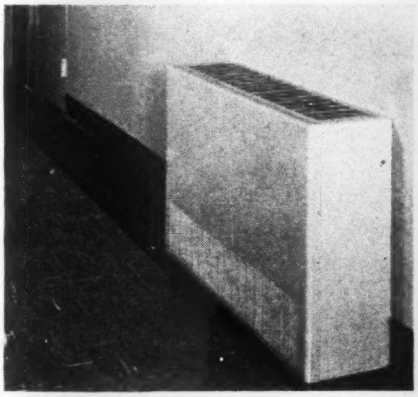
Complete acoustical ceiling and fluorescent lighting treatment as well as air conditioning is extended throughout all engineering and drafting spaces as well as private offices and main office areas. Double pane heat insulating windows and glass block serve not only to supplement the air conditioning but also to exclude noise from outdoors.

Practically the entire area below the administrative and engineering spaces is excavated and this basement area houses supplementary engineering facilities, a printing department, and a product display room, besides providing vault and reserve filing spaces.

Increased production area was needed also and this new structure has added approximately 35,000 sq ft of manufacturing space to the company's existing Racine facilities as a result of moves made possible by the new unit. While this is a modest addition to manufacturing space, its availability has permitted extensive revamping of production lines. Closer coordination is being experienced between administration and sales, engineering and production, now that the company's administrative offices and its Racine factory are no longer separated by the main lines of the C. & N. W. Railroad, as was the case through the war years.

All Ductwork in Ceiling Space

Another unusual feature of the air conditioning and heating installation is that the entire supply and exhaust duct systems are in the ceiling. Aspirating air diffusers are used, the supply air entering the conditioned space around the periphery of the diffuser and the exhaust air from the space returning through the center of the diffuser.



Convectors on outside walls and cabinet unit heaters (as shown here) in interior areas supplement the air conditioning system, can keep the building at comfortable temperatures during overtime evening hours or on week-ends

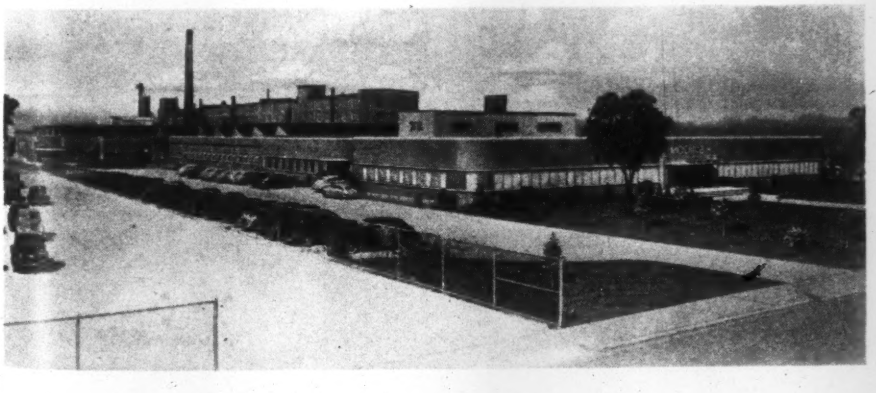
The ducts are insulated with 1 in. asbestos board covered with asphalt emulsion.

The panels of the acoustic ceiling are removable to provide access to equipment in the ceiling space where the ducts run. The ceiling height is 10 ft, 6 in.

City Water Precools Air

The refrigeration compressor and the air handling equipment—preheat, reheat, cold water, and direct expansion coils; mixing dampers; filters; humidifier; and fans—are in a penthouse, with direct supply and return duct runs to the air distribution system in the ceiling space. The load totals approximately 80 tons of refrigeration, but it is believed that the single 60 ton condensing unit presently installed will be able to handle the job, as cold water from the city main is used for precooling the air. This precooler water then goes to the refrigeration condenser, thus being used twice. Space is available in the penthouse for a second compressor unit should additional refrigerating capacity prove necessary in the future.

This view of the plant shows the new administration and engineering building in the foreground



Supply fan No. 1 in the penthouse, of 23,020 cfm capacity, serves the general offices and basement, and supply fan No. 2 (9575 cfm) the drafting room and engineering offices. Exhaust fan No. 1 has a capacity of 15,615 cfm, and No. 2 is rated at 6085 cfm. The toilet exhaust fan (No. 3) takes 2120 cfm from those areas. The supply air is filtered by both dry filters and an electrostatic air cleaner.

Total occupancy of the building is approximately 150 people.

Control Coordinates Convectors, Air Conditioning

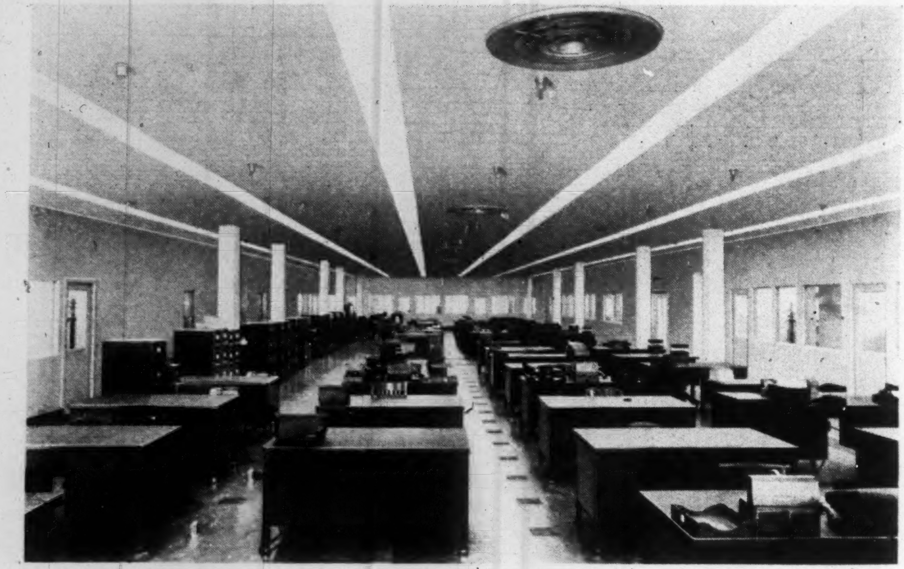
The method of coordinating the convection heaters and the air conditioning system is quite interesting, and—according to the engineer who planned the controls—this installation "has everything in the book to make a good control job."

Up to about 75 percent of the design heating load can be handled by the air conditioning system. At this time, the modulating valves on the convectors are two-thirds open and as the room temperature drops, the modulating valves open wider. At night—after the air conditioning system has been automatically shut down—control is by a night thermostat set at 60 deg and governing the steam supply to the convertor, in the basement, which furnishes hot water to the convectors and cabinet unit heaters. Steam is supplied the convertor from the existing boiler plant serving the factory.

The room thermostats are set at their winter setting of 72 deg all winter, and in the summer, as the outside temperature rises, the setting of the thermostats is increased so that as the outside temperature increases from 72 to 100 deg, the inside setting is increased from 72 to 82 deg.

The system has automatic change-over from heating to cooling, and back again. When the city water used for precooling and light loads can no longer handle the cooling load, the refrigeration machinery is brought into operation automatically.

The air is dehumidified in the summer by bringing it to a low



Complete acoustical ceiling and fluorescent lighting treatment as well as air conditioning is extended throughout all engineering and drafting spaces as well as private offices and main office areas. The acoustical panels are removable for access to the ceiling space in which the ducts run

enough temperature to accomplish this purpose; reheating is available all summer when desired, so that the proper temperatures and humidities are maintained. Humidistats are located in the return ducts in the fan room.

Sequence of Control Operation

Available space precludes publishing a complete control diagram for this installation, but the following description of the sequence of the operation of the controls will explain their functioning.

Heating

Room thermostats in the space served operate mixing valves for the convectors and mixing dampers in the duct system, in most cases. Three spaces have room thermostats that operate mixing dampers only. Where mixing valves and mixing dampers operate together, the sequence is as follows:

A drop in space temperature causes the mixing dampers to open to heat. When the mixing dampers are 75 percent open to heat, the mixing valve starts to open. When the mixing dampers are 100 percent open to heat, the mixing valve is 65 percent open. Further drop in space temperature opens the mixing valve wide.

A reheated air thermostat (whose bulb is in the air stream following the reheat coil) operates to maintain a discharge temperature of 90 deg during the winter cycle by modulating two valves in the steam line to the reheat coil in sequence.

A preheated air thermostat (whose bulb is in the fan discharge ahead of the reheat coil) maintains 60 deg discharge by operating a valve in the steam line to the second preheat coil, bypass damper, and maximum fresh air, return air, and exhaust air dampers as follows:

On a rise in temperature:

1) Steam valve to second preheat coil closes.

2) Bypass damper opens.

3) Maximum fresh air opens.

A mixed air thermostat (whose bulb is in the air stream ahead of the preheat coils) operates to open a valve in the steam line to the first preheat coil if the mixed air temperature drops below 35 deg.

Convertor

A thermostatic bulb will operate a steam valve to maintain the desired supply water temperature to the convector three-way valves.

Night Control

A night thermostat in the space operates a relay at night to open and close a steam valve on the convertor and thus maintain the space temperature through the heat from convectors.

Winter Humidity

Humidistats in the return air ducts operate to open valves in the steam supply lines to the humidifiers if the humidity drops below their setting. These valves close on fan shutdown.

Change-over

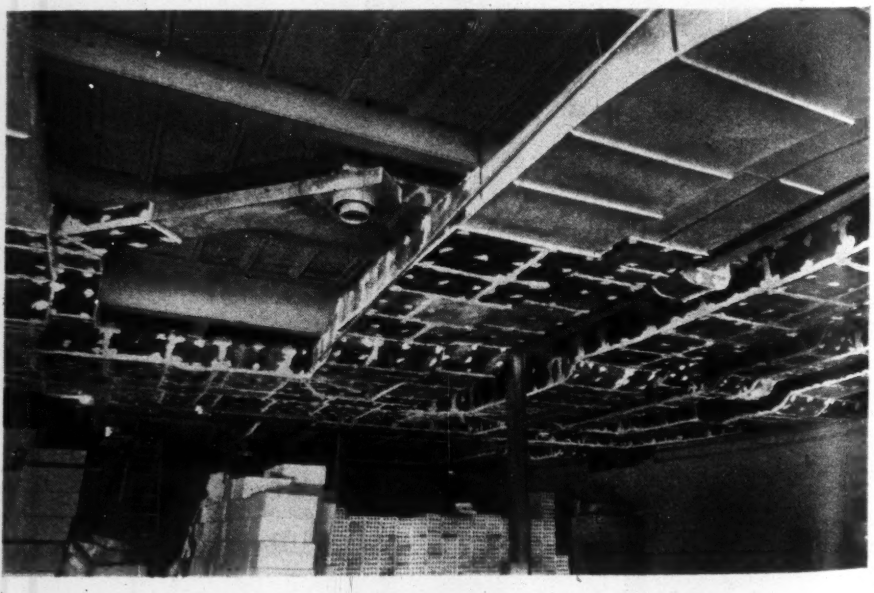
A change-over thermostat in the fresh air duct is set to change the system from heating to cooling at 60 deg outside temperature. It accomplishes the following functions:

1) Operates relays to cause fresh air dampers to hold a wide open position. These relays also keep the steam valves supplying the humidifiers closed.

2) Operates relays to close bypass dampers.

3) By operating a pressure switch it stops the circulating pump supplying hot water to the convectors and turns off the steam supply to the convertor.

All of the supply and return ductwork is run in the space above the acoustical ceiling. Supply air enters the conditioned space around the periphery of each diffuser, the return air returning through the diffuser center



4) By operating another relay it furnishes air to permit controllers, whose bulbs are in the two respective fan discharge air streams, to operate the water cooling coil and refrigeration.

5) By operating another relay it resets the temperature maintained by the reheated air thermostat to a lower control point (80 deg).

The above five operations can also be accomplished automatically by a humidistat whose bulb is in one of the two main return ducts, to bring on refrigeration to dehumidify.

Cooling—Fresh air damper control

At the time change-over occurs (60 deg outside) the fresh air dampers will be wide open (due to the preheated air thermostat, which is trying to maintain 60 deg). When the change-over is accomplished the fresh air damper is held wide open until outside air is no longer useful for cooling. At this time the fresh air thermostat (whose bulb is in the fresh air duct) will close the outside air to minimum (72 deg).

Cooling Coils

A cold air thermostat, whose bulb is in the fan discharge, will operate the water coil and refrigeration to maintain the cold deck temperature as follows:

1) On a rise in discharge temperature, the thermostat will modulate a water supply valve to provide water cooling using city water.

2) Additional rise (after the water valve is wide open) causes mechanical refrigeration to come on (through a pressure switch) at 50 percent capacity. The next two steps of refrigeration will be brought on by the thermostat if the discharge temperature tends to continue to rise.

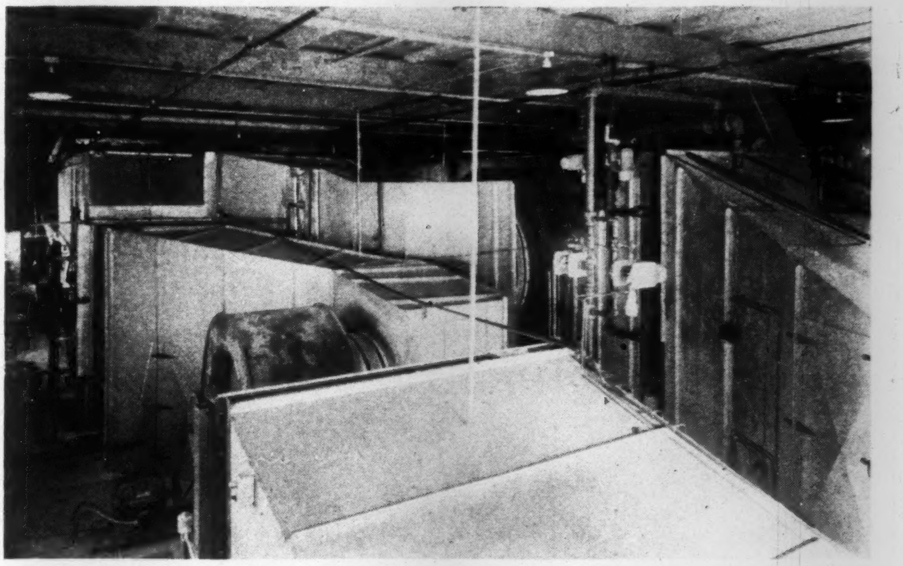
Note: When the pressure switch starts the compressor, a relay closes a valve to force all cooling water through the refrigeration condenser.

Summer Humidity

A humidistat whose bulb is in the return air will operate to raise the control point of the cold air thermostat if the humidity drops, and lower the control point to dehumidify when the humidity rises.

Summer Temperatures

The room thermostats will maintain room conditions by mixing cool air and reheated air in proper proportions.



The air handling equipment and the refrigeration compressor are in a penthouse, with direct duct connections to the ceiling ductwork. There are two main supply and two main exhaust fans, and a toilet exhaust fan. City water is used for precooling the air to reduce the compressor capacity required. This photo was taken during installation before the insulation was applied to ducts and plenum chambers

Reset

A master thermostat in the fresh air duct will gradually raise the temperature maintained by all the room stats as the outside temperature increases. (The room thermostat control point raises from 72 to 82 deg as the outside temperature goes from 72 to 100 deg).

The program clocks are set to make the circuits placing the air conditioning equipment in operation daily, Monday through Friday, from 7:00 a.m. to 5:00 p.m. and to break the circuits on the same days from 5:00 p.m. to 7:00 a.m. On Saturdays the circuits are made from 7:30 a.m. to 12:00 noon, and broken from 12:00 noon Saturday to 7:00 a.m. Monday.

The architect was Graham, Anderson, Probst and White, of Chicago. White Bros., of Racine, was the ventilating contractor, and the heating contractor was Wiertz & Hughes Heating Co., of Racine.

NEW DATA ON GASES WILL AID INDUSTRY, GOVERNMENT

More knowledge than now exists of the properties of gases soon will be available to supply a vital need of industry and to assist government agencies, it was reported last month at the 68th annual meeting of the American Society of Mechanical Engineers, which was held at Atlantic City.

A special research committee on the properties of gases and gas mixtures has been set up by the ASME. This group already has laid the groundwork for its program by a survey of many industries and consultation with several government agencies.

The physical and thermodynamic properties of gases and gas mixtures are among the tools used by engineers in many exact calculations. While standard tables are now in use, basic data are often inadequate as new design problems are faced in many industries. To supply fuller knowledge, allowing for revision and growth in reference data as new facts become known, will be the purpose of the ASME committee.

Priority of interest, according to the ASME survey, was indicated in the following groups of gases, in the order named: basic gases, hydrocarbons, gas mixtures, refrigerants and process gases, inert gases, disassociated gases, minor atmospheric gases, propulsion gases.

Major interest centered in thermodynamic properties of constant pressure specific heat, constant volume specific heat, internal energy, enthalpy, entropy, and compressibility; physical properties of viscosity, thermal conductivity, and emissivity.

Design Engineer Reports on Operating Experience

PRACTICAL PIPING PROBLEMS

THE LAST WEEK of our 3½ week trip from Abadan, Iran, to Sydney, Australia, provided more than its share of trouble in the engine room. As would be expected, the main difficulties centered around the worn and troublesome fuel oil pumps.

About five days out from Sydney we had our worst *and the last* of the "transfer incidents" which had plagued us for the entire trip because of the carelessness and indifference of the engineering officers in keeping the engine room properly informed as to what was going on. In this case, we had put on the deck steam because the first engineer had requested it in order to pump out the bilges of the forward pump room. Along toward the end of my watch it was noticed that the steam pressure was dropping a bit on the main steam gage in the generator room. The chief was immediately called to see if anyone had opened a drain or other steam line on the deck service. While this was being checked, we started to check our bunker temperatures.

At this time, the fireman notified us that the fuel oil coming into the fire room from the bunkers had dropped from 108 to 88 F and was still dropping. We immediately telephoned for help and opened up the steam coils to the bunkers. This time we also opened the steam chaser (tracing) line on the fuel oil suction to the pumps. This raised the oil temperature in about 10 min to 105 F but seemed to have little effect in correcting our trouble. Despite slowing down from our previous speed of 90 rpm, the steam pressure had dropped from 440 to 400 psi, the oil pressure at the burners (as regulated by the combustion control) had increased from 175 to about 250 psi, and the pump pressure had increased from 280 to 310 psi despite a drop in the discharge pressure in the fire room. Ultimately it was necessary for us to slow down to 52 rpm in order to recover our boiler pressure. Even then, our burner pressure was very high, indicating that we were having difficulty maintaining even a third of our normal power.

Following this, there were the usual recriminations, alibis and vitriolic conversations that seemed to follow such incidents. But the initial source of the trouble this time arose because the second engineer had decided to transfer the remaining fuel oil in the forward tanks to the bunker tanks aft. He had thought that only about 40 barrels remained to be transferred and didn't think it was necessary to notify the engine room; actually, the amount transferred was about 160 barrels. In addition, our bunkers, aft, were very low so that the incoming oil immediately chilled the oil in the tanks. Besides this we were getting the dregs from the forward tanks.

It was a matter of four or five hours later before we were able to get back up to about 88 to 89 rpm, and this was accomplished only by forcing the fuel system, and using a very high burner pressure (250 psi) for this power. In fact, it was nearly 20 hours later before our burner pressure came down to the normal 165 psi for the power required at 89 rpm.

Sludge Cause of Pumping Trouble?

There were various theories for our continued difficulties, the main one being that there was water in the oil. The thought behind this was that the first engineer was supposed to have been careless in

JOHN H. CLARKE was after information on the problems with piping systems, pumps, valves, heaters, control and other mechanical equipment faced by the operating man . . . how designs perform in actual service . . . how equipment is actually operated . . . when he (a marine design engineer by training and profession) shipped on a tanker as junior third assistant engineer. By the time his seagoing was completed (he's back on land as a design engineer with the Standard Oil Company of Indiana) he got plenty of practical information on piping, pumping, heating, ventilating, and other subjects. His comments and observations are continued here from our December issue. A lot of what he found out applies not only to marine work but to the design, operation, and maintenance of mechanical equipment in plants and buildings as well.

An aerial view, looking from North Sydney to Sydney. Botany Bay, where Cook first landed in Australia, is in the distance. Kirribilli Point, where the author's ship tied up for repairs, is just out of sight to the left. Note the extreme irregularity of the harbor

checking his valves and as a result, had dumped water into the forward tanks while pumping the bilge of the forward pump room. Because the chief and second engineer seemed to particularly dislike this first engineer, they apparently tried to shift the blame onto him. But in actuality there was no indication of water in the oil. My fireman had been firing for about 25 years and he was positive that there was no water in it, and just as positive that what had happened was that we had gotten a considerable amount of sludge of low heat value from the bottoms of the forward tanks. Because this was dumped into the aft tanks, which were also low, it probably stirred up sludge in these tanks also. This seemed by far the most tenable explanation, and it was borne out later when I had a test sample checked at Washington, D.C., after returning to the United States. Unfortunately a test was not made for heat value, but the sample was found to be free of water and to consist of a high percentage of sludge, sand, and vegetable matter.

While the above incident did nothing to improve relations between the various officers, it did end once and for all this business of transferring water and oil without notifying the engine room (which was something for which we could be thankful.)

Two days following this occurrence and three days before arriving at Sydney, we finally started heating our cargo preparatory to pumping it out when we arrived. This was the usual thing—the unusual part of the procedure was that we were heating *all* of our cargo. Our No. 2, No. 3, and No. 4 center and wing tanks were carrying heavy (bunker C, No. 6) oil which always requires heating for pumping. But our No. 5 and No. 6 center tanks were carrying distillate (one cut below kerosene) and the Nos. 7, 8, and 9 center and wing tanks were carrying diesel oil. Probably this was one of the few times in history that anyone heated distillate or diesel oil so that it could be pumped. And in view of the fact that the sea temperature at the time was only 62 F and the air temperature was 56 F, and that it seldom gets below 40 F at Sydney even in the dead of winter, this business of heating these light oils became even more ludicrous.

But it was our business to furnish the heating steam when the captain asked for it, and as long as the lines weren't in danger of falling apart it was none of our business how much, or what, they heated. Of course the chief engineer nearly laughed himself silly when he found out what the captain was doing; however, because of the existing ill feeling between the deck and engine departments, he wasn't butting in on anything. The electrician was just as surprised. Prior to the war he had owned and operated a filling station, garage, and industrial fuel business in Colorado. While he had pumped thousands of gallons of light fuel oils in the dead of winter during temperatures well below zero, this was the first time *he* knew that the oil should have been heated.

Reducing Valve Specs Should Be Complete

Anyway, in every cloud there is supposed to be a silver lining. In this case it seemed like a fine opportunity to check up on a few things that I had been wondering about while working at the shipyard on the design of these ships. The cargo heating system was supposed to operate with steam at 60 psi, this steam being furnished from the deck steam main through a reducing valve. The deck steam was supplied from the main boiler superheated line via a desuperheater and reducing valve. At the shipyard we had nothing to do with the purchasing of most of the equipment for these ships, except for items added or changed, or in cases where it was necessary to get immediate delivery. But in reviewing the specifications for reducing valves, we noticed that they were being ordered by size only, for a given reduction. The capacities were not specified. Under the circumstances, and because of several instances which had arisen with several of the manufacturers of these valves, there was reason to believe that they did not have the necessary capacity of about 26,000 to 30,000 lb per hr of steam which it was estimated that the full cargo heat load required.

For our present heating on this ship, we were not using all of the heating coils nor were the steam valves wide open. Even at this load, however, we could not meet the steam requirements even though the cargo heating reducing valve was wide open (screwed down) and bypassed, and the deck steam reducing valve was likewise screwed down.

The condensate from the cargo heating came back to a three section inspection tank, which provided an ideal means of measuring the condensate flow. So with the help of the fireman, several tests were run to check the loads. The maximum flow of these tests showed only about 16,500 lb per hr of condensate. So it was evident that the capacity of the reducing valves did not meet the requirements by much more than half. Could anyone ask for a better example of why it is necessary to provide *complete* specifications when purchasing such equipment? For those who may be interested, the deck steam reducing valve was 3 in. size and reduced the steam from about 440 psi to 125 psi. The cargo heating reducing valve was 4 in. size and was supposed to reduce the steam from 125 psi to 60 psi. Both valves were of the self-contained piston type with diaphragm operated pilots.

Pinhole Leak in Pipe Elbow

About the same time that we started the cargo oil heating, we discovered a pinhole leak in the bottom of an ell in the condensate line from our "second stage" heater (actually a third stage heater in the usual heat balance). This feedwater heater was heated with auxiliary steam at 70 psi, and drained through a drainer (float trap) to the discharge line from the atmospheric drain tank pump, and thence it went to the deaerating heater. But the condensate pumped from the drain tank was comparatively cool, and because of the flashing which occurred in the heater drain line, considerable water hammer resulted. So because of the condition of flow, the flashing and the water hammer, there were large possibilities for erosion.

Probably the immediate cause of this line failure was the fact that some workman (when the ship was originally built) apparently hadn't been able to find a welding ell, or else had been too lazy to get one, and instead had bent a piece of standard pipe to the same radius as a welding ell. It very evidently did not work out. The ell eroded out very rapidly, and a day out of Sydney it was necessary to cut out the second stage heater and by pass the feedwater around it. The other drains which normally were pumped from our drain tank to the deaerating heater were drained to the condensers instead, and were thus fed back into the feed system. This of course upset the feed and condensate systems of the plant and resulted in considerable heat loss, but it did not interfere with the operation of the plant.

However, when the repair was made at Sydney, it required a temporary and partial plant shutdown, because of the fact that the leak followed the shutoff valve on the drain, and the 10 psi pressure on the deaerating heater forced water and steam to back up in the line. There was no valve in the line at the deaerating heater. An inspection of the leaking elbow revealed a hole about $\frac{3}{8}$x$\frac{1}{4}$ in. in size surrounded by several pinholes. The rest of the bottom wall of the ell was paper thin. We were lucky it lasted as long as it did, and that it didn't really *blow* out.

We arrived at Sydney on my watch (as usual) and proceeded up a harbor which has been described by a number of people who have travelled sufficiently to speak with authority as the second most beautiful harbor in the world. (Rio de Janeiro seems to be the first choice.) It certainly must be all of that. If memory serves correctly, there are around 140 miles of shoreline, most of which is improved—either as private lawns or as public park areas. As was the case with Wellington, N. Z., the harbor is as nearly spotless as possible, in contrast to the shameful conditions of contamination and flotsam that prevail in our harbors in this country.

"Second Most Beautiful" Harbor

We had the opportunity to see a considerable amount of the harbor inasmuch as we delivered oil to widely separated points deep in it. Following this, we circled the outer reaches of the harbor while they tried to decide where to park the ship for repairs. We finally wound up at a dock about 50 yards offshore from Kirribilli Point, a stone's throw (with the help of a catapult) from the governor-general's Sydney (actually, North Sydney) residence.

This was a splendid place to be tied up for a few days. Even though the dock was out from shore we had drinking water service (with the usual left-handed valve and English threads at the connection), telephone service directly to the ship and water taxi service. It was wonderful in contrast to our past experiences.

We had three important duties to take care of in Sydney. The first was to discharge our fuel oil, which we had completed. The second was to try to straighten out the personal animosities existing on the ship. The third was to make the repairs necessary to continue our voyage. According to our information at that time we were supposed to return to Abadan and then head for Hong Kong and Yokohama. That probably would have been fatal. This ship was in no condition for continuing on such voyages. And with our crew, we'd have been a ship full of mental cases by the time we returned to the United States. The close confinement of a ship can really bring trouble with an uncongenial crew.

"A-fussin', A-feudin', and A-fightin'"

Our main troubles centered around the feud between the captain and the chief engineer; the first engineer, who seemed to be playing both ends against the middle so that he could get the chief's job; the apparent incompetence of both the first mate and the first and second engineers; the feud between the captain and the second engineer; the attempt of the captain to have both the chief and the second engineers removed from the ship; and the long-standing dislike of the crew generally for the purser, who was suspected of having come along for the ride.

The matter was taken before the American consul at Sydney with all the charges and countercharges that one would expect in such circumstances. It seemed to some of us that the American consul handled the situation in about the only manner possible. He told all parties concerned that he was a busy man and didn't have time for all of this foolishness, and that they should start acting like grown men and not like little boys. The War Shipping Administration representative cleared the air a bit further by instructing the captain to tend to his end of the ship and to let the chief engineer run his end. The only loser in all of this uproar was the first engineer who, by repeatedly going over the chief's head and by acting independently, had maneuvered himself into an untenable position. He left the ship for reasons of health.

It would have been interesting to know what a working knowledge and practice of the fundamentals of industrial relations would have done with our troubles. With a little decency, thoughtfulness, cooperation and a little less of the "Captain Bligh" complex, most of this animosity could have been avoided.

Piping and Pumping Repairs Made

With the air slightly cleared as far as our personnel problems were concerned, we concentrated on the repairs necessary to prepare for our next trip. The leaking ell in the condensate line from the second stage heater was repaired by welding a patch over the bottom of the ell. Why a new ell was not welded in is not known.

The screw type lubricating oil and fuel oil service pumps were removed for repair. It was found that on the lube oil pump which had been giving us trouble, the end clearance was $\frac{1}{32}$ in. We didn't hear what the figure was for the casing clearance. On the forward fuel oil pump, the end clearance was $\frac{1}{16}$ in. and the maximum casing clearance was 0.011 in., the wear being oval. We had spare rotors for these pumps but of course they were of no use because it is the casings, *not the rotors* that wear.

Therein, I learned something new. In pumps, many of us are apt to think in terms of the rotating parts wearing (excepting bearings, of course). It was partly with this in mind that spares for rotating parts are standard for most marine equipment. In this case, it would appear to be a mistake, unless the rotors were damaged by solids getting into the pump. In such a case, the pump casing would probably be damaged, too.

To repair the pumps, the machinists installed new thrust washers in the ends so as to decrease the clearance, and they were then replaced on the ship. The one lube oil pump showed some improvement for a while, but after several days of operation, the discharge pressure dropped spasmodically, and it was shut down in favor of the second pump, which seemed more reliable.

The fuel oil pumps showed little improvement and for most of the trip after leaving Sydney, it was necessary to operate with the two pumps running in parallel, checking them frequently to be sure that one was not overheating because of being backed off the line by the other.

In order to keep the plant in operation, one fuel oil and one lube oil pump were repaired while the standby pumps were in operation, and vice versa.

The forward main feed pump which had been giving us so much trouble was also repaired at Sydney. It was necessary to install a new rotating member, complete with the casing wearing rings that came with the assembly. Fortunately the War Shipping Administration had such a spare available in Sydney; otherwise, we would have been in a fine fix. We were supposed to have had a spare on the ship, but when it was "exhumed" on the way from Abadan to Sydney, it was found to be an old rotor which had been replaced the year previously at Yokohama. Apparently someone had overlooked providing a new spare prior to leaving Baltimore. Besides replacing the rotating member, it was necessary to replace the journal and thrust bearing of the feed pump and the journal and thrust bearings (combined unit) on the turbine for the pump. All were in a very sorry state. As previously stated, the pump thrust bearings were fused and practically nonexistent.

Careless Work of Machinists

It is difficult to say what the reasons were that caused this pump to have excessive bearing trouble. There were many who believed that the design was too light to be suitable for marine use, considering the rolling and vibration of a ship. In the shaft alley where these pumps were located, the vibration was the greatest of any place on the ship. Other engineers have felt, with reason, that the pumps should have had a circulating oil system in lieu of the ring oiling with which the pumps were provided. Where such systems were installed, the pumps apparently did give better service.

But one cannot overlook the fact that it was always the forward pump that gave *us* trouble. This seemed indicative of poor work by the machinists. In Baltimore, for instance, the machinists had been so careless that they had not removed excess weld metal on the cutwaters of the casing. In this condition the rotor could not be turned by hand, but they were going to attempt to start the pump anyway. Fortunately, they were stopped by the third assistant. Also, in bluing in and checking the bearings, they must have been equally careless, for the pump only lasted about four days before the bearings wiped.

The David Jones Elizabeth St. store as seen from Hyde Park in Sydney. There are numerous air conditioned buildings in the city despite the mild temperatures

It is worth noting in this connection that when the machinists at Sydney finished with the pump, we had no more trouble with it. All of their work was of the same high quality. We have machinists just as good in this country, but their reputation is being tarnished by many careless, half-trained, pseudo-specialists that are running around loose, *disguised* as machinists.

Late in the week which we spent at Sydney, we learned that our orders had been changed and that we were to go directly back to the United States. This was indeed good news, and was brought about mainly by the generally poor condition of the machinery—the lube oil and fuel oil pumps, the broken gland stud on the main circulating pump, and two bilge pumps which were in failing condition. The personnel problems previously mentioned were also a definite contributing factor. None of us was sorry to be on his way home.

A Beautiful City, With Air Conditioned Stores

Our stay in Sydney, however, was most pleasant. Sydney is a city of around 1,500,000, with a metropolitan population of about 2,500,000. It is very "Americanized," as we like to think of it, and if one discounts the fact that transportation and pedestrians keep to the left, and that the monetary system is different, he could not tell it from any large city in this country—except that it is cleaner, has fewer slums, and is possibly more beautiful.

Sydney harbor is a paradise for sailing, and it has the most extensive local and express ferryboat commuting service of which I have ever heard. The train, commuting train, and bus service are at least the equal of what we have in most of our cities with the exception of New York City.

The stores are just as modern and as good. We were particularly impressed with David Jones, Inc., which appears to be *the* department store in Sydney. Probably because buildings are limited to 12 or 13 stories, this store is in three units. While these stores are not completely air conditioned, the ground floors of the two older units are, as are the ground and "lower ground" floors of the new unit. In all, this represents a total of 400 tons of refrigeration.

One other large department store, a number of smaller shops, all of the first run theaters, many of the office buildings, restaurants, and similar buildings have air conditioning installations. The theater conditioning units run from 80 to 100 tons for the smaller theaters and up to 200 tons for the larger. Despite the mild temperatures (both hot and cold) there appears to be an excellent field here for the air conditioning engineer. Along this line, we asked one old fellow just how cold it got in Sydney in the winter. "Pretty cold, pretty cold", he said, "sometimes it gets away down to 40 (above zero). According to Cherne, the summer mean temperature is 71 F, the winter mean is 54 F, and the air conditioning design temperatures are 90 F. dry bulb and 72 F. wet bulb. (For further interesting information in this regard and with respect to Australia generally, read Some Personal Observations on Australia, by Realto E. Cherne, Refrigerating Engineering, September 1943, pp. 171-174.)

With our destination and repair problems reasonably well settled, we got down to the final preparations for sailing. This consisted mainly of all able bodied hands swarming ashore for a last fling. (All, that is, except for the "lucky" persons whose turn it was to keep the home fires burning on night watch, in which category I was.)

The electrician, one oiler, one fireman and I were the sole representatives of the engine department. By about 2:00 a.m., the fireman, who had been on duty over 30 hours, had become not only useless but a real hazard in the fire room because he was so sleepy, so he was sent off watch, and the oiler and myself started up and cut in our second boiler (one of our two boilers was always taken out of service in port and the burners were lighted just often enough to keep the pressure up to about 150 to 200 psi). Together with the electrician, we then readied the rest of the machinery, including starting and warming up the main turbo-generators and starting the main air ejectors. We then checked out the navigating equipment. Before sailing, it is required that the steering gear, whistle, and engine order telegraph be checked for proper operation and that the engine room clock be set to the official time kept in the chart room. With all of this completed, we were all set to sail when the rest of the crew arrived on the ship early in the morning.

SHOW WINDOW IS COMFORT COOLED

In celebrating its 66th anniversary early this fall, Donaldson's (Minneapolis department store) had some special store window exhibits, including a man working on overstuffed furniture, girls demonstrating new ironing equipment, etc.

Combined heat from the sun, the lights, and equipment was such that two comfort coolers and two 2 hp air cooled compressors were installed. The compressors were placed in the basement adjacent to the show windows. The coolers, which are normally suspended, were mounted on pedestals, due to lack of beams from which to suspend them.

Throughout the period of the exhibits, the temperature was held to 75 F.

Donald
Levin Br
McQuay

This cooling unit—normally suspended but in this case mounted on a pedestal—kept the temperature in this show window at 75 F for the comfort of the man working on overstuffed furniture as part of a special anniversary display (Courtesy McQuay, Inc.)

Practical Pointers on

AIR CONDITIONING PLANT OPERATION

By Donald A. Kepler, Chief Engineer,
New York Stock Exchange Building Co.

Skilled Operating Personnel Needed

If there is a nebulous figure in air conditioning, it is the fellow who *operates* the system. He may be the most important man in the building operating picture or he may be the office boy. Whichever he is, he and his complex job are important to building owners who—in their struggle to secure the best operating results from their air conditioning systems are faced with a host of quasi-technical problems.

ASIDE FROM GOOD equipment design and arrangement, fine operating results are dependent on two basic requirements—a suitable organizational setup that will impart direction to an operating program, and adequate operating skill that will lend force to the operating program. It is Mr. Kepler's purpose here to analyze these two factors and discuss a practical way to approach each of them

Air conditioning has changed in the past 20 years. Yesterday's equipment, borrowed from other fields, has been displaced by today's specially engineered plants. The emphasis has shifted away from mere air cooling; it is now on true comfort conditioning the year around. That is why operating a modern system is not merely starting and stopping a machine. It is operating a plant composed of special apparatus, carefully designed to perform a special service. Operating a plant that may have cost half a million dollars or more is operating engineering and it requires an operating engineer.

Aside from good equipment design and arrangement (which are generally the responsibility of a consulting engineer) fine operating results are dependent on two basic requirements. These are the responsibility of the building owner or plant manager:

1) A suitable organizational setup that will impart direction to an operating program. All too often, the organizational setup is inherited by the man who operates the system.

2) Adequate operating skill that will lend force to the operating program.

These two elements require special attention, for without them the effectiveness of good design cannot be brought to a fair test. It is my intention to analyze these two factors and to discuss a practical way to approach each of them. The purpose is to assist the building owner by giving him an awareness of the importance of the operating phase, an appreciation of the problems confronting the operating staff, a suggested form of organizational setup, and an outline of the qualifications of a skilled air conditioning operating head.

Operating is made up of three factors — operating performance, maintenance, and operating economy.

Operating performance provides the evidence by which the systems are judged. Consequently, it is the No. 1 consideration.

Maintenance is of secondary prominence but certain minimum requirements must be met or performance will be adversely affected. Too little maintenance can be a hazard from the standpoints of health, of material damage, and of fire. On the other hand, maintenance is expensive and too much will not be tolerated by the alert building owner. Considerable care is needed to keep this factor in balance.

Just the opposite applies to operating economy. Too strenuous an application of economy measures imposes limitations on performance, while the total disregard of economy makes air conditioning a liability.

Owners, design engineers, and apparatus manufacturers all are interested in total air conditioning results—they want to see the best results from the least expense. The part being played by operating personnel in securing these results is becoming recognized. However, we must find some way to pin down this air conditioning operator, to delineate his duties, and to establish a standard of qualifications so that these duties can be performed in the best interests of total air conditioning results.

Functions of Operating Organization

Let us begin with the problem of organizational setup. Since there is no such thing as a "typical" operating organization, it is necessary to start with an analysis of basic functions.

Essentially, there are two parts to air conditioning operation. One is the *production phase*, which includes the operation of the refrigerating machinery, the cooling tower, and the circulating pumps, and, in addition, the steam or hot water heating equipment. The other is the *air handling phase*, which covers the operation of the air units. The functioning of the "production" equipment is susceptible to fairly rigid scheduling (the output can be held in accordance with a pre-arranged plan), while the air units must be operated by day-to-day judgment and hour-to-hour adjustment.

Organizational Setup

The operating setup that fits the production phase probably will not suit the air handling phase, yet the two must function in harmony. As with any organizational problem, a great deal depends on the individuals involved. Consequently, the approach suggested will not be appropriate for all plants. The general idea is this:

Give full responsibility for the supervision of the air handling phase to a competent "operating head." A title such as "Air Conditioning Engineer (Operating)" properly covers the scope of his duties. His responsibility should cover operating performance, maintenance, and operating economy as applied to *air handling*. But this is not all. Add to his responsibility two of the three aspects of the *production* phase, operating performance and operating economy. The remaining factor—maintenance of the "heavy equipment"—can be best cared for by the engine room force.

The air conditioning engineer's supervision of the performance and the economy features of operation is, in a sense, nominal since he should not have to concern himself with hour-to-hour operating problems. However, giving him authority over performance and economy is advantageous because it is the best way to assure the proper scheduling of operations and the only way to establish control over operating economy as applied to the production phase—refrigeration in particular. With the refrigerating plant operating as it does, at partial and varying loads, the engineer in direct charge (say the watch engineer) has certain discretionary latitude. The air conditioning engineer will be able to control the range of plant operation by coordinating the desired performance schedule with the ideal operating technique, as dictated by economic factors.

As I see it, the air conditioning engineer should be subordinate only to the chief engineer—a sort of vice president in charge of air conditioning. Diagramatically, the setup looks like that shown on the accompanying chart.

The diagram indicates a point of possible conflict of responsibility. However, it is not uncommon or especially harmful to have an apparent overlapping of authority—better this than an open break in the line of responsibility. Cooperation is an indispensable bond in any organization regardless of the smoothness of the theoretical organization chart.

Personnel Requirements

To know what constitutes adequate personnel to cover the air handling phase of operation is the owner's most difficult problem. Obviously, the problem is to provide operating talent commensurate with the operating task. Unfortunately, evaluation of the operating task does not lend itself to a categorial accounting, and inevitably the talent requirements will be different for every plant.

The number of assistants needed and their qualifications will depend primarily on the maintenance requirements as determined by the operating head and his experience. The careful selection of these men is important because they may be able to contribute some specialized skill to the talent pool. Needless to say, the operating head must be familiar with all phases of air conditioning operation; but for large plants, with their inherent complexities, familiarity is not nearly enough. He must be fairly expert to qualify as the air conditioning operating engineer.

Operating Skill

Operating an air conditioning system is, in some respects, like conducting an orchestra. The size of the orchestra, the variety of instruments, and the musical arrangements all have their counterparts in air conditioning. As these features determine the degree of skill expected of a conductor to satisfy the performance standards of a critical audience, so corresponding features determine the skill required of an air conditioning operating engineer.

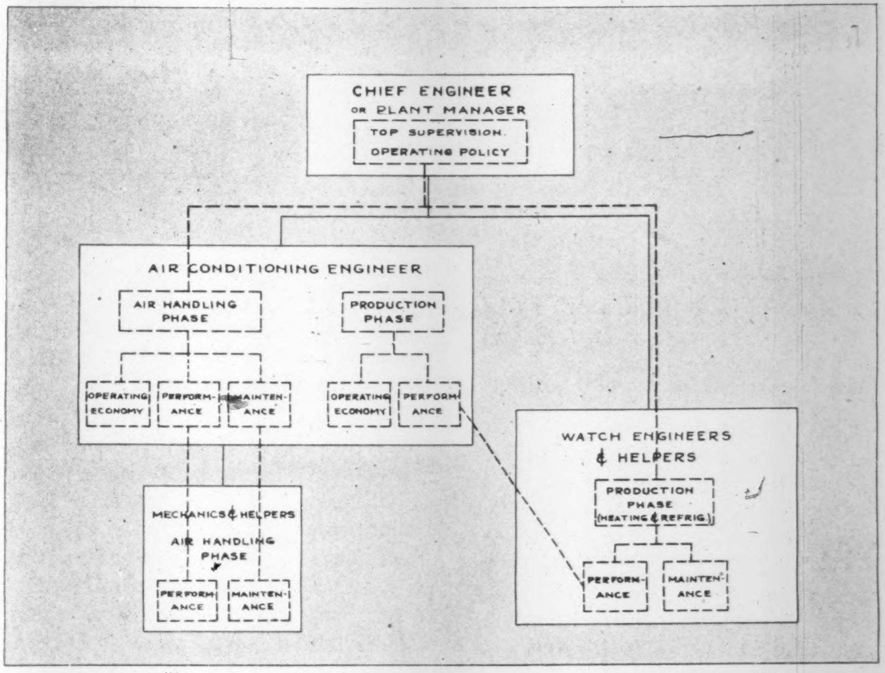
The specific qualifications of expert operating people can be broadly classified as: personal attributes, technical training, and experience in the field. What each of these qualities individually contributes to the desired total, and which one should therefore receive the most consideration, is open to debate.

Personal Attributes

Self assurance is a requirement when the operator is dealing personally with complainers. Nearly all complaints require care in handling, since the psychological factor plays an important part in comfort. While this factor should be recognized, it should never be used to rationalize complaints. Attitude is a significant factor. If the approach is, "What are we doing wrong?" instead of, "You can't satisfy everybody," there is a good chance that some corrective measure can be found.

Air conditioning is frequently important enough to be a matter of policy. The air conditioning engineer should be able to talk authoritatively with management on matters pertaining to his special field.

Supervisory ability. The air conditioning engineer should be able to act effectively in a supervisory capacity in handling his subordinates and in setting up their duties. He should be able to plan operating schedules for the plant and working schedules for the operating force.



This diagram is a combination *organization* and *function* chart illustrating the suggested setup for air conditioning plant operation. The solid lines represent the organization part and the broken lines represent the function part of the chart. While many variations of this plan may prove equally successful, the better schemes have one thing in common: They recognize the importance of a skilled air conditioning engineer and they give him authority

Technical Training

Air conditioning operating engineers should be thoroughly familiar with a rather wide range of technical subjects.

General physics provides the groundwork for many of the other technical subject requirements and it specifically provides a working knowledge of the many instruments and controls used in air conditioning operating. It also provides an understanding of the methods of calibrating these instruments.

Thermodynamics provides the basis for an understanding of psychrometry, heat exchange phenomena, refrigeration cycles, and the method of converting operating performance into operating economics.

Fluid mechanics provides the basis for the solution of air distribution problems and liquid flow problems.

Elementary electricity provides assistance in operating the many electrical machines and devices and in detecting faulty operation of these elements. Electrical maintenance, however, is not ordinarily within the province of the air conditioning engineer.

Chemistry of materials provides an understanding of effective water treatment practice and a knowledge of the proper selection and use of protective coatings for the maintenance of air conditioning apparatus.

Engineering drawing, with emphasis on mechanical layout, furnishes the only means of looking at an air conditioning problem objectively. Nearly every discussion of air conditioning questions involves an inspection of drawings, duct layouts, space conditions, electrical schemes, or piping arrangements.

Air conditioning as a subject is largely the study of the subjects enumerated above taken in combination. Proficiency in the individual subjects is a prerequisite to the study of "Air Conditioning Theory and Practice."

If this list seems to place excessive emphasis on technical training, it is suggested because air conditioning operating is an exceedingly intricate business. While we all are aware of instances in which totally untrained and inexperienced persons have apparently been able to operate large plants with success, I prefer to regard operating engineering as a precise science, the continued success of which depends on engineering judgment, not on luck.

The effective utilization of technical training requires the support of experience gained in the field. Experience in designing equipment, control systems, duct layouts, and piping arrangements, and experience in testing refrigeration and ventilation systems, are great assets in air conditioning operation. Experience in air conditioning plant operation is certainly a desirable quality. However, experience in designing equipment, control systems, duct layouts, and piping arrangements, and experience in testing refrigeration and ventilation systems are even greater assets in air conditioning operation.

I do not mean to imply that the air conditioning operating engineer should be called upon to design air conditioning changes and improvements, but merely that he should be able to recognize the need for changes when and as the occasions arise. Despite the efforts of designers of air conditioning systems to make provision for flexibility of operation, building alterations and occupancy shifts conspire to alter the relationship between cooling or heating load and air distribution. Recognition of the factors that enter into the design phase will assist the air conditioning engineer in dealing with factors related to the operating phase.

STOKERS AID FUEL SAVING

Automatic coal stokers are available "in sufficient quantities to meet any demand from users of fuel, and installation of this equipment can be made within a few hours without serious inconvenience to the customer almost anywhere in the United States," Marc G. Bluth, executive secretary of the Stoker Manufacturers Association, said last month.

"This may become an increasingly important factor as winter weather sets in throughout most of the nation," he continued, "for with supplies of fuels being on the 'thin' side, the efficient, time tested method of utilizing coal in furnaces and boilers with underfeed stokers contributes materially to the conservation of fuels."

Here Are More Ideas on How to Control
ZONED UNIT HEATER SYSTEM

Suggestions on how best to solve the following unit heater control problem were asked for by "J.H." in his question published in the October HPAC:

"A building is divided into three distinct heating zones, with different temperature requirements and different rates of heat loss. Each zone is to be heated by a unit heater of suitable size and supplied by steam from a low pressure oil burning steam boiler. Temperatures in each zone are to be separately controlled, no unit heater motor shall run unless there be steam in the heater, the burner shall shut down when all zones are satisfied and shall start when any zone requires heat, and the number, type and cost of control equipment shall be kept at a minimum."

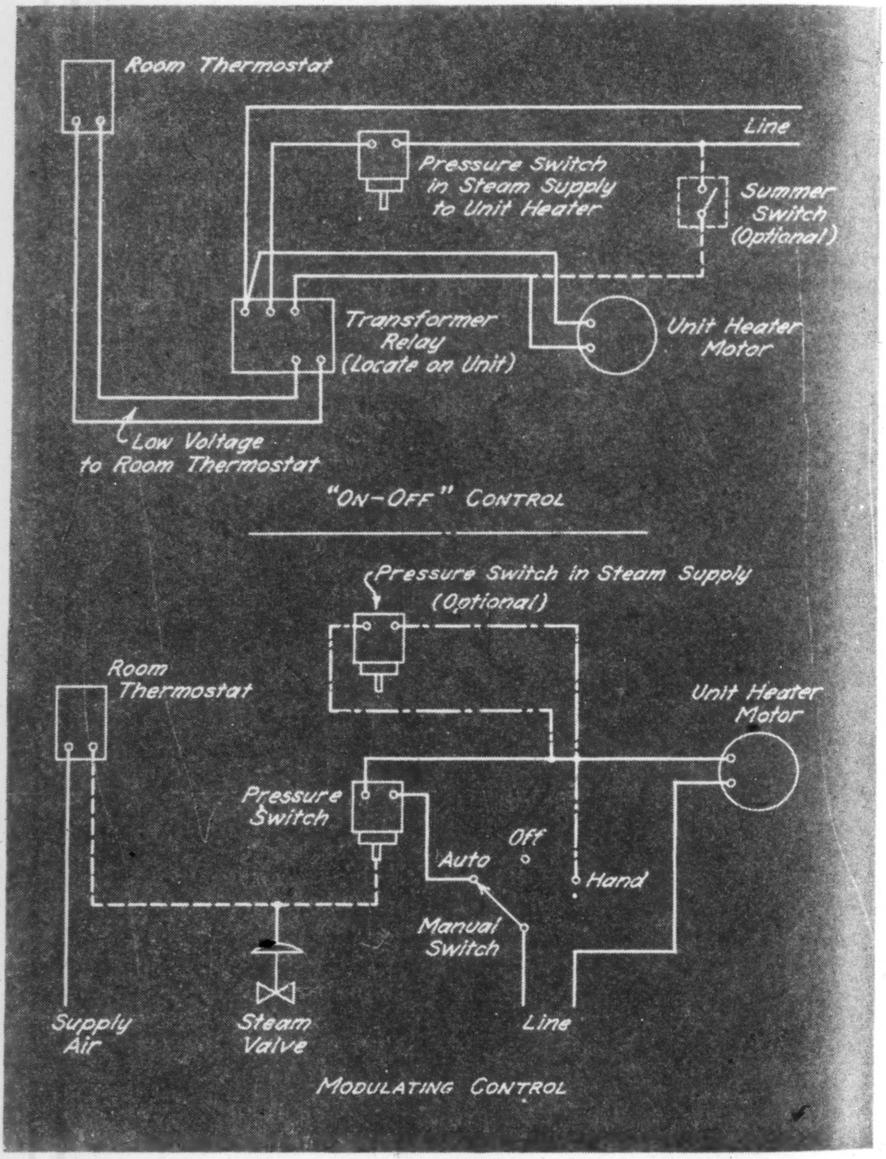
A number of answers to these questions have been received from HPAC's readers. Several were published in December, and additional suggestions are given this month.

BOILER SHOULD OPERATE AT CONSTANT PRESSURE

We have reviewed the material in the December Question of the Month department on how to control zoned unit heater systems. All of the systems, as outlined, are workable; some, of course, are more practical than others. Not having a complete specification and job requirement, it is rather difficult to say which would produce the best results, most economically, but we do not feel that it is practical to go beyond the use of room thermostats for the control of space temperatures. If we were called upon to do a job of this kind, and were given the information outlined at the beginning of the article, our recommendations would be as follows:

1) The boiler should operate at constant pressure at all times. The oil burner should be controlled from a pressure control mounted in the steam header at the boiler, in conjunction with the standard burner and safety controls furnished with the boiler. This pressure switch would maintain a high limit boiler pressure, during periods of light or no steam demand. This will produce the most economical boiler operation. A boiler which is allowed to fall below the steaming point, because of shutdown when there is no steam demand, will consume more fuel in generating the required steam pressure, when the demand for steam is made, than if it maintains steam pressure when there is no demand. When the boiler shutdown method is used, the low temperature boiler condition exists to a greater extent during mild weather, which tends to defeat the economy derived from the use of an automatic control system.

2) The space temperatures should be controlled by the intermittent operation of the unit heater fan motors from properly located room thermostats. Each room thermostat


Room Thermostat
Line
Pressure Switch in Steam Supply to Unit Heater
Summer Switch (Optional)
Transformer Relay (Locate on Unit)
Unit Heater Motor
Low Voltage to Room Thermostat
"On-Off" Control
Pressure Switch in Steam Supply (Optional)
Room Thermostat
Unit Heater Motor
Pressure Switch
Off
Auto
Hand
Manual Switch
Supply Air
Steam Valve
Line
Modulating Control

"M.M.H." shows here the wiring and piping required for each unit heater for "on-off" and modulating control should control its respective fan motor through a transformer type relay mounted on the unit heater. When the transformer relay is used, it allows the room thermostat to be of the low voltage type, which greatly reduces wiring costs between thermostat location and the unit heater. Inasmuch as line voltage must be run to the unit heater, for motor operation, the most economical location for the transformer relay is at the unit heater location.

3) A normally open steam pressure switch should be installed in the steam supply to each unit heater and interconnected with the fan motor, to prevent fan operation when steam is not available. This pressure switch may be wired into the main feeder circuit to the unit heater, or it may be inserted into the fan motor circuit, between the relay and the fan motor. A summer "on" switch may be wired into the circuit, to bypass all controls so as to operate the unit heater fans for air circulation during the summer season.

Modulating Control

The above system is the "on-off" type of control, which is one of two systems which can be used on unit heater applications. Modulating control systems also may be applied to unit heaters. While modulating control is generally more expensive than the "on-off" types of control systems, the tendency toward air stratification and the delivery of hot blasts of air are eliminated, and more uniform space temperatures are produced. Modulating control may be obtained with either electrically or pneumatically operated control equipment. When modulating control systems are used, the fan is allowed to operate continuously, to provide constant air circulation.

The basic control consists of a proportional action room thermostat, a steam valve, a pressure switch, and a manual switch to control the fan motor.

The proportional action room thermostat reacts to space temperatures in such a way as to position the steam valve on the unit heater steam supply, thus providing the correct discharge air temperature to maintain a given space condition. The pressure switch is connected into the thermostat control line and is set to open the fan motor circuit, when the thermostat has throttled the valve to some predetermined point. In this manner the possibility of discharging air at too low a temperature, when the steam valve is throttled to the near-closed position, is eliminated.

The setting of the pressure switch will be determined by the characteristics of the unit heater on which it is installed. An additional steam pressure switch may be installed on the upstream side of the automatic control valve, and wired into the fan motor circuit to prevent the fan from running when steam is not available.

The accompanying sketches show the wiring and piping required for each unit heater for each of the two systems.—M.M.H.

SUBMITS SKETCH SHOWING SCHEME

I WOULD LIKE to submit the method outlined on the accompanying sketch as a solution to "J.H.'s" question on zone heat control, in his case the heating equipment being unit heaters.

The sketch and notes are self explanatory. As an alternate two "line voltage" thermostats could be used in each zone, thus eliminating the "transformer-relays," but the scheme outlined will be cheaper and I believe the "two-step" thermostat will be more easily adjusted to the desired operating conditions.

I enjoy your news of interest to the industry, your articles, and the descriptive items on new equipment. —J.E.W.

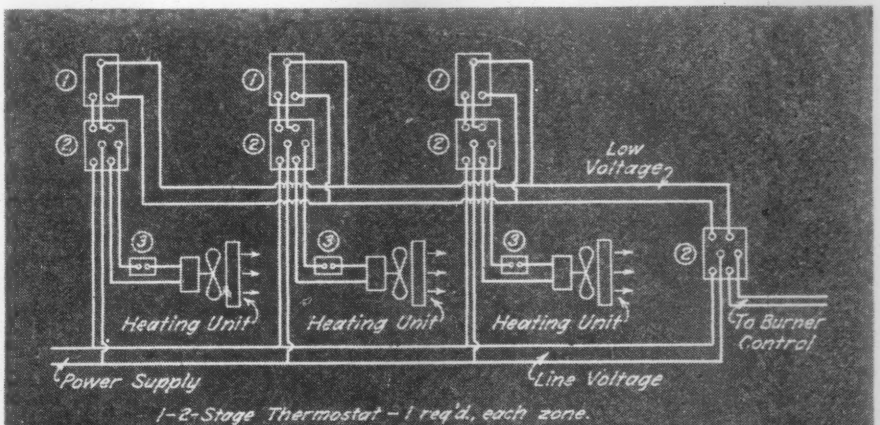
QUESTION OF THE MONTH

YOU ARE invited to submit a heating, piping, or air conditioning question for publication here. You are also invited to submit answers to previously-published questions from others. Those published are paid for at regular rates. Address the Editor, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2, Ill.

SIMPLE CONTROLS AND PIPING GIVE BEST RESULTS

THE UNIT HEATER control problem from "J.H.", published in October, is common in heating practice and is many times made more complicated and expensive than necessary. A few dollars worth of controls for each zone and no change in the piping will give better results than most of the more complicated systems, in my opinion.

"J.E.W." submits this method for zone control of unit heaters



1-2-Stage Thermostat—1 req'd., each zone.
2-Transformer Relay—1 req'd., each zone and burner.
3-Clamp-on Aquastat—1 req'd., each zone.

SEQUENCE OF OPERATION:

First step on either thermostat will start burner.

Second step on either thermostat will start fan if steam has been on coil long enough for condensate to operate the aquastat.

As each zone is heated, thermostat will cut off fan and zone burner control.

Burner will not shut off until all zones are satisfied.

Thermostats can be set for desired conditions in respective zones.

QUESTION OF THE MONTH

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Each zone will need an ordinary low voltage thermostat, such as is used to control an oil burner, and a relay that will close a separate circuit at the same time the load circuit closes. Each unit heater should be equipped with a temperature control on the heater return connected in series with the heater motor to prevent the fan from running until the heater is filled with steam.

In my sketch, I have shown a mercury tube type of relay as it is easier to follow the internal circuit but all control manufacturers make a corresponding type. The pilot circuit is connected with thermostat cable to the master burner control, usually a stack relay.

In operation the thermostat closes its contacts on a drop in temperature. The pilot circuit contacts close and the burner starts. The load contacts close at the same time and as soon as the heater is filled with steam the reverse action aquastat allows the fan to run, which it will continue to do as long as the thermostat is calling for heat.

When one zone calls for heat, all the unit heaters in the other zones will fill with steam. At first thought this might be considered an objection and tending to defeat the idea of zoning. However, I have found no case where the small amount of heat given off by the core of a unit heater, when the fan was not running, was enough to prevent the proper control of temperature.

Controlling Radiators in Same System

Sooner or later, one is sure to run into a case where there is an office or other zone heated with radiators of some kind that will need to be controlled. That can be taken care of by running a separate steam line to that zone and controlled by an automatic valve with a thermostatic control. The return will need a check valve to prevent water from backing up into the radiators when pressure is on the system but no heat is needed in the office area.

Most motorized valves have provision for starting the burner when the valve opens. Some types of zone valves, however, require a relay to make the burner start when the valve opens.

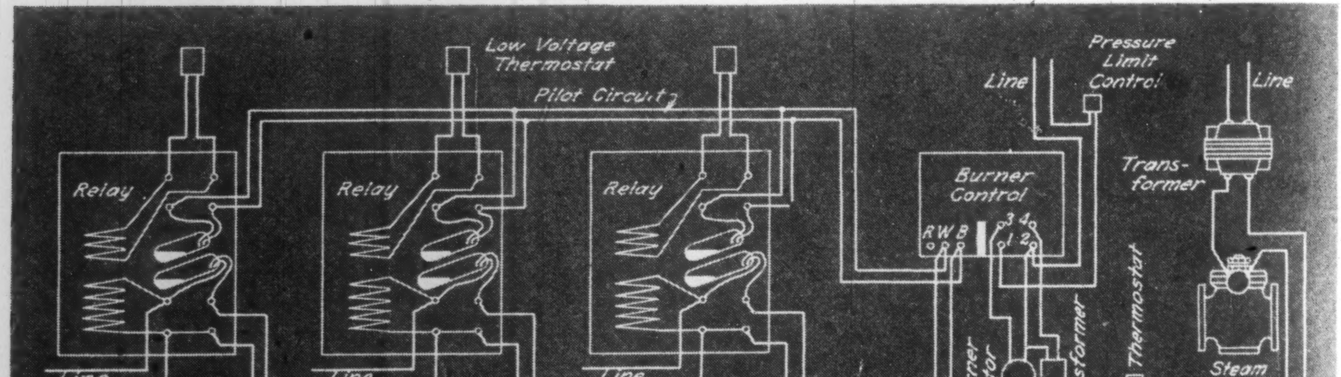
One common type of valve uses an electric heater to increase the pressure in the bellows and hold the valve in a closed position. This circuit is broken by the thermostat allowing the heater to cool and the valve to open. I have shown the electrical hookup of such a valve using a relay and an ordinary thermostat. When the thermostat calls for heat the relay closes, breaking the heater circuit and closing the pilot circuit to the burner control, causing the burner to start.—R.H.M.

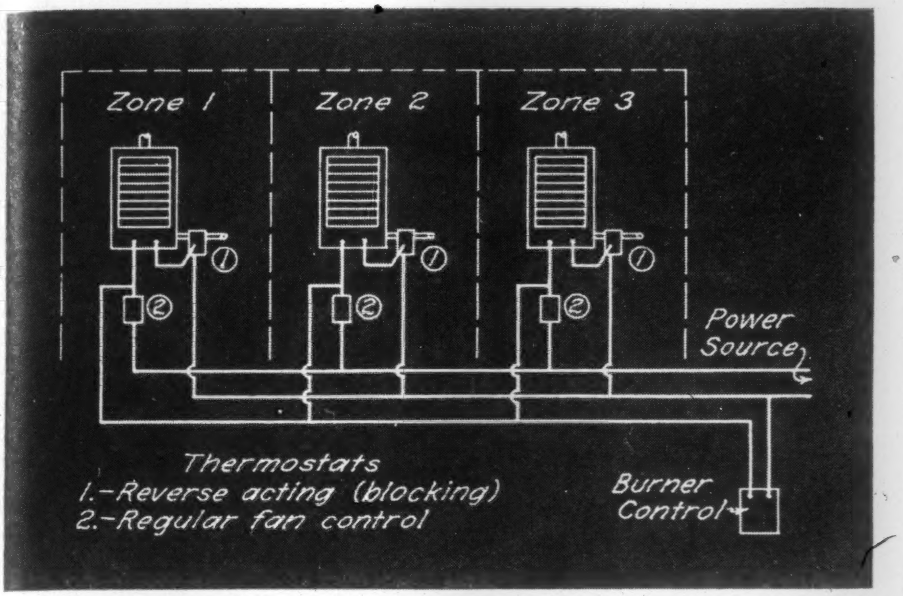
ANY ZONE STARTS HEAT, LAST ONE STOPS IT

REFERRING TO THE question from "J. H." in the October issue on the control of zoned unit heaters, my sketch shows one method by which the results desired can be obtained.

The first thermostat to call for heat starts the burner and that particular unit heater fan starts when steam reaches the coil. Of course, the other heaters will then have

Here is "R.H.M.'s" suggested solution to the unit heater control problem





With this arrangement, any zone can start the heat but only the last one out can stop it, says "D.R.S."

steam but their own fan thermostats will control them individually as to heat output. The last thermostat to open will shut off the burner.

Any zone can start the heat but only the last one out can stop it.—D. R. S.

PLANNING YOUR VISIT TO BIG EXPOSITION

THESE MORE OR less serious questions—often asked the editors—were published in the November HPAC:

"How do you plan your inspection of the exhibits at a big exposition of heating, air conditioning, ventilating, refrigerating, power or other mechanical equipment so that you don't miss the things of interest to you, and so that you don't spend too much time on the exhibits that aren't of immediate concern?

"Also . . . How do you keep your feet from wearing out?"

Following is some comment on this matter:

"The question of arranging an inspection of exhibits at a large exposition of heating, air conditioning, ventilating, refrigeration, power, or other mechanical equipment presents problems much like those handled by many capable secretaries who "send" their employer to far parts of the country on an exacting schedule.

The secret of success consists of examination and correlation—examination of that which is to be done, and correlation with the time available in which to do it. Exhibits which are considered most desirable to see should be listed in the order of their deemed importance of subject matter. The total time available should then be broken down to permit a maximum period for the major interest, less time for second most important interest, and so forth, until the entire period has been accounted for.

If a plot plan of the exhibition is available (and they certainly should be in the case of larger exhibitions), a path of travel should be laid out between points of interest in such a way as to minimize lost time in transit between exhibits and to save wear and tear on feet. A time schedule may then readily be obtained by correlating the path of travel and time allotted to the various exhibits along the way, commencing with the time of anticipated arrival at the exhibition. If exhibits are located an appreciable distance from each other, proper time must be alloted for covering the distance, and a corresponding period deducted from the time available for viewing exhibits. An average rate of foot travel for men is 3 mph, or ¼ mile each five minutes. Once the time schedule is prepared, it must be obeyed if everything initially listed is to be seen.

Should some exhibits prove of more interest than the original time allotment indicated, shift the entire schedule back the extra time period used. This demands an equivalent omission from the end of the schedule; however, the least important subject was considered as having last place on the original schedule. A disadvantage of this type of planning is that exhibits which have the least importance will be seen when the visitor is more fatigued; however those considered of prime importance will be viewed when the visitor is fresh.

The problem of keeping feet from wearing out is indeed an old one, for Caesar's legions suffered therefrom. However, the proper fitting shoes are of benefit. They should be roomy and comfortable—and broken in. Leave new shoes at home! Toes should not be cramped, and heels should be made of rubber. Avoid metal cleats or taps embedded in heels. Socks should be clean, the correct size, and of sturdy construction—leave silks at home. If possible, during the noon hour or other schedule period of rest, the feet should be washed—not soaked—and dried thoroughly before replacing shoes.

Of course, after the feet have worn down to the ankles, it's time to call a halt. The mind has long since ceased to grasp any benefits from what the eyes see."—J.E.Y.

WHAT'S BEST WAY TO SAVE HEATING FUEL?

You are invited to comment on the following question from "D. D." Suitable discussions of this matter will be published, and paid for at regular rates (with additional payment for sketches). Address The Editor, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.

"There are many, many things that can be done to save fuel required for building heating, but I wonder if it is possible to say what the one most effective method of heating fuel conservation would be? I'd be interested in any comments from readers as to what management of the 'average' small industrial plant or commercial building should look for when the possibilities of fuel conservation are being considered?"

Card No. 50
Job No. ___

___ SERVICE, GAS: A ___ "gas service will be provided by others through the meter in the boiler room to within 10 ft of the boiler heater to the point indicated on the plans. This Contractor shall make all connections from this point to all his equipment.

___ SERVICE, WATER: A ___ "water service shall be provided through the meter in the boiler room to within 10 ft of the boiler to the point indicated on the plans by others. This Contractor shall make all connections from this point to all his equipment and a drains as indicated on the plans.

12/19/46
Card No. 51
Job No. ___

(winter air conditioning system, direct fired, oil)

___ CONTROLS: An electric clock thermostat shall operate the gas oil burner in conjunction with a combination furnace controller and burner protecting device. On a drop in room temperature the thermostat shall start the burner. When the fan discharge temperature reaches ___ 100 F, the fan shall start. The burner shall continue to run until the fan discharge temperature reaches ___ 140 F, at which time it shall stop, but the fan shall continue to run. When the discharge temperature falls to ___ 120 F, the burner shall again start and continue the above sequence of operation until the room temperature is satisfied, at which point the burner shall stop. The fan shall continue to run until the discharge temperature falls to ___ 80 F, and then it also shall stop.

A "Summer-Winter" switch shall be provided to operate as follows: "Summer" position operates fan motor continuously; "Winter" position controls operate automatically as hereinbefore described.

An "Emergency" switch (ON-OFF) shall be provided and located adjacent to the "Summer-Winter" switch which will stop the operation of all electrically operated equipment.

(stoker or hand fired-add)

The combination furnace controller shall include the safety feature of an over-run switch which shall cause the fan to run to dissipate the heat should the discharge temperature rise to approximately ___ 160 F above the fan setting of the controller.

12/19/46
Card No. 52
Job No. ___

(hot water system, forced circulation)

___ CONTROLS: A clock type thermostat shall operate the circulator and gas oil burner stoker through a "Summer-Winter" controller, and high limit aquastat. When the thermostat calls for heat, the circulator and the burner stoker shall start simultaneously and normally continue in operation until the proper room temperature is reached. Should the boiler water temperature exceed ___ 160 F, the burner stoker shall stop but the circulator shall continue to operate. When the thermostat is not calling for heat, the burner stoker shall operate by means of the "Summer-Winter" controller to maintain the boiler water at ___ 140 F to assure an adequate supply of domestic hot water. The circulator shall operate only when the room thermostat calls for heat.

Zones in addition to the basic zone described above shall each be controlled by its respective thermostat, relay, and circulator. Each thermostat shall operate its respective circulator through its relay which shall also control the oil burner operation as hereinbefore described for the basic zone.

12/19/46
Card No. 53
Job No. ___

(one direct expansion AC unit)
(one compressor- one evap. cond.)

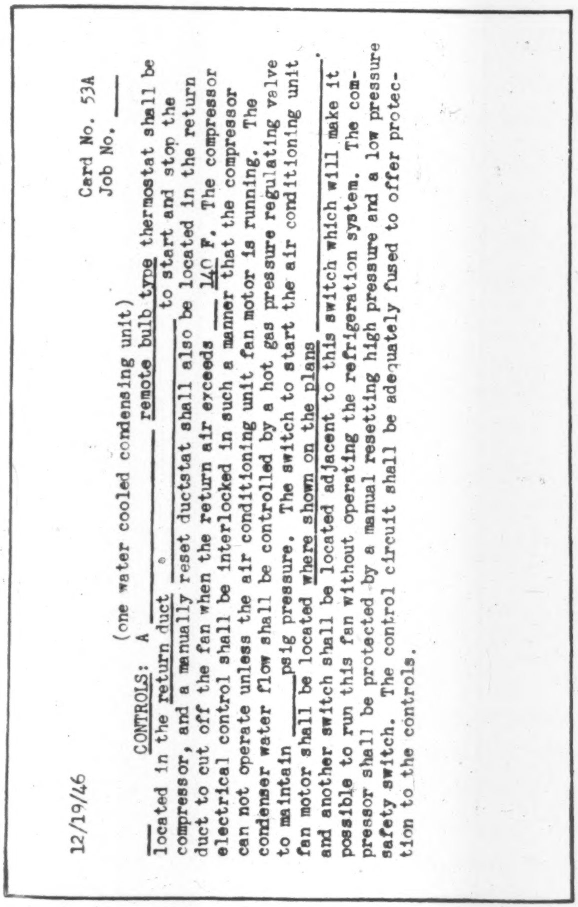
___ CONTROLS: A ______________ remote bulb type thermostat shall be located in the return duct ______________________ to start and stop the evaporative condenser fan motor which in turn will start and stop the evaporative condenser pump motor. The compressor electrical control shall be interlocked in such a manner that the compressor can not be operated unless the evaporative condenser pump is operating, and the evaporative condenser fan motor electrical control shall be interlocked with the air conditioning unit fan motor so that the motor can not run unless the air conditioning unit fan motor is operating. A manually reset ductstat shall also be located in the return duct to cut off the air conditioning unit fan motor when the return air exceeds ___ 140 F. The switch to start the air conditioning unit fan motor shall be located where shown on the plans ____________________________, and another switch shall be located adjacent to this switch which will make it possible to run this fan with out operating the refrigeration system. The compressor shall be protected by a manual resetting high pressure and a low pressure safety switch. The control circuit shall be adequately fused to offer protection to the controls.

DATA SHEET

Simplified Procedure for SPECIFICATION WRITING

Because of a number of requests from readers for more information about the method described in George W. Campbell's article, A Simplified Procedure for Specification Writing, in the April 1946 HPAC, it was decided to run as a supplement to this article a series of specification cards which are used by the firm of Urdahl and Everetts, consulting engineers, in their Washington, D. C., and San Francisco offices. Mr. Campbell is employed in the Washington office.

Several of the cards have been published (and details of their use explained) in the June-December 1947 issues inclusive, more appear this month, and others will follow. These specifications are not to be construed as recommendations to other consultants but to illustrate this card file used by Urdahl and Everetts.

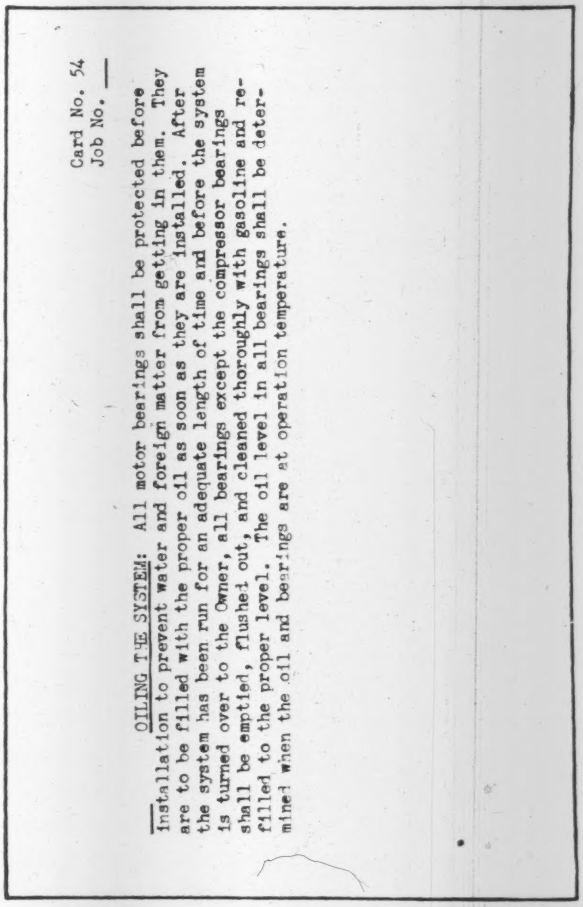


12/19/46

Card No. 53A
Job No. ____

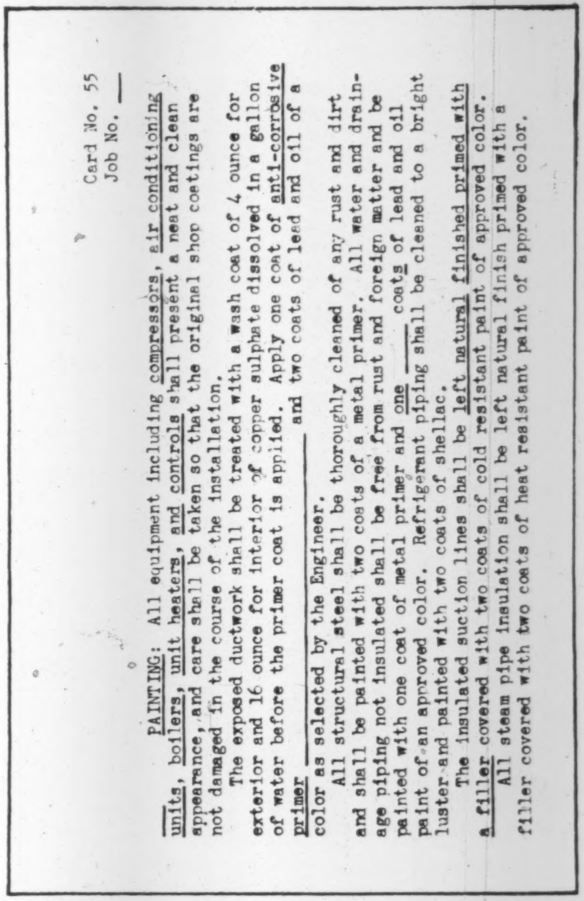
(one water cooled condensing unit)

____ CONTROLS: A ______________ remote bulb type thermostat shall be located in the return duct ______________ to start and stop the compressor, and a manually reset ductstat shall also be located in the return duct to cut off the fan when the return air exceeds ___ 140 F. The compressor electrical control shall be interlocked in such a manner that the compressor can not operate unless the air conditioning unit fan motor is running. The condenser water flow shall be controlled by a hot gas pressure regulating valve to maintain _____psig pressure. The switch to start the air conditioning unit fan motor shall be located where shown on the plans ______________. and another switch shall be located adjacent to this switch which will make it possible to run this fan without operating the refrigeration system. The compressor shall be protected by a manual resetting high pressure and a low pressure safety switch. The control circuit shall be adequately fused to offer protection to the controls.



Card No. 54
Job No. ___

____ OILING THE SYSTEM: All motor bearings shall be protected before installation to prevent water and foreign matter from getting in them. They are to be filled with the proper oil as soon as they are installed. After the system has been run for an adequate length of time and before the system is turned over to the Owner, all bearings except the compressor bearings shall be emptied, flushed out, and cleaned thoroughly with gasoline and refilled to the proper level. The oil level in all bearings shall be determined when the oil and bearings are at operation temperature.



Card No. 55
Job No. ___

____ PAINTING: All equipment including compressors, air conditioning units, boilers, unit heaters, and controls shall present a neat and clean appearance, and care shall be taken so that the original shop coatings are not damaged in the course of the installation.

The exposed ductwork shall be treated with a wash coat of 4 ounce for exterior and 16 ounce for interior of copper sulphate dissolved in a gallon of water before the primer coat is applied. Apply one coat of anti-corrosive primer ______________ and two coats of lead and oil of a color as selected by the Engineer.

All structural steel shall be thoroughly cleaned of any rust and dirt and shall be painted with two coats of a metal primer. All water and drainage piping not insulated shall be free from rust and foreign matter and be painted with one coat of metal primer and one ____ coats of lead and oil paint of an approved color. Refrigerant piping shall be cleaned to a bright luster and painted with two coats of shellac.

The insulated suction lines shall be left natural finished primed with a filler covered with two coats of cold resistant paint of approved color.

All steam pipe insulation shall be left natural finish primed with a filler covered with two coats of heat resistant paint of approved color.

"OPEN FOR DISCUSSION"

Cite Advantages of One Pipe and Two Pipe Gravity Heating

Mr. Lewis' comments on his "page" in September on one and two pipe gravity steam heating systems were very interesting in that they gave but little "place in the sun" for a fundamentally simple piping system. Taking steam in and condensation back out of a single opening of a radiator is okay when the valve controlling this opening is opened sufficiently to allow water to exit against the incoming steam.

Many of the oldtime buildings have one pipe gravity systems which are still operating reasonably satisfactorily, for most of the tenants depend on the fireman to shut down the boiler when the day warms up, or just simply open their windows if the radiator is still under steam and it becomes too warm in the room. At least that is common practice in California, whether they have gravity or vacuum systems. The savings in fuel by subatmospheric vacuum systems in this part of the country do not generally get much consideration, for the total annual fuel bill is not large.

In order to make a vacuum system effective, it is necessary to put a device on the return connection of each radiator which will always distinguish between steam and condensate and close promptly when all of the water and air is evacuated from the radiator or at drip points in the steam mains. It is asking a lot of a radiator or drip trap to do this year after year with the amount of service attention they ordinarily get. When traps pass steam into the returns, the operation of the vacuum pump is in jeopardy and the pump simply lays down on the job until a cold water line is added to the pump suction connection to do a steam condensing job in order to keep the pump running. All the cold water added becomes a direct waste of both heat and water.

Back in 1916 I went back to Chicago on a visit from Salt Lake City and incidentally dropped into the boiler room of one of the larger hotels which had only been completed a year or two. The engineer was very proud of his vacuum heating system. I asked him if he had to add any water to his pump suction. In answer he put his hand on the wheel of a valve in a ½ in. water line connected to the pump suction. To his surprise it was wide open instead of only cracked open, as he had previously remarked.

Two Pipe Swing Check Gravity Jobs

Such evidence got me interested in two pipe swing check gravity installations where you don't try to distinguish between water and steam at either end of the radiator. You maintain a hot (covered) return back to the boiler room where you drop it vertically and connect it wet to the boiler return header. The function of the swing check valve on the return end of each radiator is to prevent the radiator from getting steam from the return line when the radiator valve on the other end is closed.

I have designed quite a few such two pipe swing check jobs for compact school buildings both in Salt Lake City and in the Los Angeles territory. The radiators of course have air valves and so do the drop points where the ends of steam mains and return mains are dropped wet. There is, of course, one very necessary requirement — sufficient clearance must be had above the boiler water line at all ends of steam mains or returns where they are dropped wet to take care of the maximum pressure drop in the piping system.

This clearance above the water line for steam piping to take care of line pressure drop is also fundamental in one pipe gravity heating systems, for you require a head in the vertical drop pipes to get the water back into the boiler—otherwise it will pile up in the steam main.

I checked an amusing job 20 years ago—a rather extended store building with a long one pipe steam main which was only about 18 in. above the boiler water line when it got back into the boiler room. This is the way the job was operating: the gas burners came on; pressure was built up to about 2 lb; condensate piled up in the return end of the steam main; the low water cutout went into operation, shutting the gas burners off; the boiler pressure dropped to zero; the water in the main then had enough head to get back into the boiler; the low water cut out, then again turned on the gas burners; and the cycle was repeated over and over, day in and day out, until the low water cutout got into trouble. Then the installation was given a condensate pump.

All of this rambling is simply to say that often we discard the old for the new without always gathering all the facts.—O. W. **Ott**, consulting mechanical engineer, Los Angeles.

LIKES ONE AND TWO PIPE GRAVITY JOBS

With more than 35 years of experience with the smallest to the largest steam plants to back me up, I find something very much wrong with the statements about steam heating made by Sam Lewis in the September issue.

I find that the one and two pipe steam plants in the largest and the smallest buildings really can work. People can comfortably occupy the buildings heated by these plants, even though Mr. Lewis indicates this is not true. I am talking about even the plants which operate without high vacuums; that is, the steam systems Mr. Lewis sneers at. These systems have many of the expensive devices Mr. Lewis dubs as "gadgets." Contrary to Mr. Lewis's opinion, these "gadgets" do work.

For example, only last week I arrived at this remarkably low fuel consumption in a one pipe steam plant: firing 8 gph of oil in a good cast iron heating boiler, I obtained a stack temperature reading of 385 F and a CO_2 reading of 11¼ percent with the cleanest, brightest flame anyone ever wants to see. Every room in the building is properly heated. No room is underheated or overheated. The boiler heat loss is next to zero, thanks to 2 in. of magnesia block insulation on the boiler (the boiler is cool to touch, even with steam pressure on the system). The chimney runs up inside the building, reducing the stack loss even below that indicated by the stack temperature and CO_2 readings. Mr. Lewis and everyone else informed about heating must agree that this one pipe steam plant achieves the "remarkable low fuel consumption" which in his article Mr. Lewis reserves for systems fitted with high vacuum pumps.

Efficient Steam Heating Systems

I have installed other systems, both one and two pipe steam, which also show high efficiency. Most of these are fired automatically, but many are fired manually by coal and work exceedingly well. Mr. Lewis must admit that a steam system is efficient when:

a) The stack loss of the boiler is low, below 20 percent of the heat in the fuel.

b) Every room receives the proper amount of heat; no room is underheated and no room is overheated.

c) Thanks to excellent insulation on the boiler and the steam and return pipes, the heat losses in the boiler room and the basement are next to zero.

Although Mr. Lewis does not indicate he knows this, it is a fact that most of the largest buildings of New York are heated by two pipe steam plants which do not operate under high return line vacuums. A system that operates under a vacuum higher than 10 in. is the exception.

At the other end of the scale comes the very small steam plant for a small home. To provide the most inexpensive form of boiler-radiator heat for small homes, many contractors install one pipe steam systems. Especially when installed in connection with heating water summer and winter (firing by oil burner or stoker), the one pipe steam plant costs far less than any other form of boiler-radiator heating. Therefore it permits giving the advantages of boiler-radiator heating to tens of thousands of owners of small homes who, were it not for this type of system, could not enjoy the many advantages of boiler-radiator heating. People can survive in homes heated by one pipe steam systems. In fact, in many homes heated by such systems, the occupants declare they are very comfortable. Fuel bills can be very low with such systems, for in the best of these systems my points a, b, and c above apply.

Mr. Lewis has not found anything that can be done satisfactorily, he says, to make acceptable the control of a single pipe gravity steam heating plant. I guess he means that ordinary one pipe steam plants don't suit him. Anyhow, here's the way to obtain any desired output from the radiators of a one pipe steam plant, especially with the plant fired automatically. Just install an excellent, modern adjustable radiator vent valve on every radiator. Adjust for slower venting if you want the radiator to give less heat; adjust the vent valve for speedier venting if you want more heat from the radiator. There's nothing complicated about that. And it works!

For two pipe steam plants, of course you use orifice discs to control the amount of heat that goes to each radiator, when you tune up a new system. Better still if you want to spend the money, install a radiator feed valve which can be adjusted for maximum opening.

"OPEN FOR DISCUSSION"

DO YOU HAVE something to say about any of the articles published this month? An additional comment, or perhaps a question on some point? We follow here the custom of engineering society meetings in allowing a period for discussion following presentation of a paper. You are invited to contribute your views. Address the Editor, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2, Ill.

Mr. Lewis indicated that water hammer and leaking of the radiator vent valve "will result eventually if there is any hesitancy or weakness or temporizing about the positive and complete closing and opening of the steam valve." There's no need to go into so many words. Water hammer usually does not come of installing cheap radiator vent valves. Also, contractors who buy the best vent valves can tell Mr. Lewis that they are not troubled by "wet carpets and serious damage." I've replaced many defective vent valves and condemned the cheapest vent valves often, but even then I've never seen a soaked carpet or signs of serious damage.

Incidentally, my home is heated by an "ordinary" two pipe steam plant. The system works well, and we love the heat it gives. The home of one of my best friends, a well known heating engineer who lays out all types of modern heating plants for buildings large and small, is heated by an "ordinary" one pipe steam plant. He loves it.—William F. Costello, heating contractor, Bay Shore, N. Y.

ADJUSTABLE VENTS GIVE GOOD CONTROL

Because the operation of modern steam heating plants is so widely different than is represented in Sam Lewis's page in the September issue, I ask that you consider publishing the following, which is an opinion of modern steam heating that conforms to the beliefs of many men who today are installing and servicing steam heating plants.

To make my letter as brief as possible, I will pick up just one part of this discussion of steam heat by Mr. Lewis, rather than dwelling individually on the many sentences he writes which appear not accurate to men who find that buildings can be heated properly today by what he sees fit to call "gravity steam systems."

For example, he said: "I haven't found anything that can be done satisfactorily to make acceptable the control of a single pipe gravity steam heating system."

My big point is that seemingly Mr. Lewis has not even heard of (not to mention having had experience with) the use of good, adjustable radiator vent valves for one-pipe steam plants fired automatically by on-off oil burners, coal stokers, and gas burners.

I obtain splendid results with adjustable radiator vent valves applied to such systems. Hundreds of other service men and heating contractors are obtaining equally splendid results.

Here Are Basic Principles

Here are the basic principles:

The length of time steam is generated by the boiler, each time the thermostat calls for heat, can be anywhere from about five to 40 min when a modern "heat anticipating" (equipped with an electric heater) type of room thermostat is used. If a special large building heat control system is used for a large building heated by one pipe steam, similarly the firing device can be made to cause the boiler to steam from about five to 40 min each time the firing device (oil burner, gas burner, or stoker) operates for heating. This is important. Steady heating, even with steam heating, can be obtained by having an oil burner, for example run for about 15 min at a time when heat is needed. But where this gives advantages, the oil burner can be made to run for five or 40 min, or any length of time in between. With the running periods about 15 min long, the heat is steady enough on any days when appreciable amounts of heat are needed, according to my experience, because the next running period of the firing device is started before the radiators become cool. The radiator temperature does vary, but in typical heating season weather, the radiators never become stone cold. Thus we avoid the discomfort of what has been called "cold 70." Remember, you can—with the modern controls—have the firing device run often, and for as short a period as five min at a time, if you are really determined to avoid bumpy heating.

With on-off firing of a modern one pipe steam heating plant, *the amount of heat given off by the different radiators is easily and most controlled.*

The thing is as simple as this: (1) When we do not vent the air from a one pipe steam radiator, the radiator stays cold. (2) With, for example, 15 min "on" periods for the oil burner, when we vent a radiator slowly compared to other radiators in the same system, then that radiator heats "poorly" or partly compared to the other radiators. (3) When we vent a radiator rapidly in the same system, that radiator becomes very hot compared to the other radiators.

In addition to equipping every steam main with the proper steam main quick vent valve, we simply install an adjustable radiator vent valve on every radiator. Now this is true in theory as well as in practice (and hundreds of practical heating experts know it works out beautifully in practice): To obtain more heat from a radiator, we adjust the vent valve for a higher venting rate, so that when the oil burner stops at the end of a 15 min run that radiator is chuckful (or nearly chuckful) of steam. To obtain less heat from a radiator, we adjust for slower venting, and the radiator can be heated only one-quarter, one-third, or one-half when the oil burner stops running.

The radiator adjusted for slow venting will give off little heat compared to the radiators adjusted for rapid venting. A development of about 15 years ago, well known and widely used today, is to install two radiator vent valves (both adjusted for highest rates of venting) on an extremely large radiator or on any radiator which is slow to heat or which for any reason should give off more heat for its size than the other radiators in the system.—NED CONKLIN, Baltimore.

[*Mr. Lewis replies to these discussions of his article in our September issue on his "Page" published this month.—Editor.*]

"OPEN FOR DISCUSSION"

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REFRIGERATED AIR DRYER FOR COMPRESSED AIR

In L. F. Wilson's article in the November HPAC on How to Figure Moisture in Compressed Air, he contends that it is not commercially practicable to cool air to atmospheric temperature after compression for removal of moisture.

During the war, we were faced with a rapidly expanding use of air tools requiring clean, dry, compressed air. After considerable experimentation, a successful refrigeration air dryer was finally constructed using "Freon" as a refrigerant and a shell and tube heat exchanger. In operation, air at 90 lb pressure was chilled to approximately 40 F, the condensed moisture removed by baffles, and the air reheated to approximately 70 F in a counterflow heat exchanger by incoming air. Using this system, compressed air was reduced to a dew point as low as minus 4 F at NTP.

Based on the success we had with these experimental units, a large refrigeration dryer has recently been installed which processes approximately 1500 cfm for the entire plant (20 F dew point at NTP).—CHARLES R. PHILLIPS, Mechanical Engineer, Montreal.

[*You will want to preserve the complete Directory Section of Heating, Piping, and Air Conditioning Equipment published in this issue for use throughout the year.*]

SAM LEWIS' PAGE

Informal comment on heating, piping and air conditioning matters is given in this regular feature by Samuel R. Lewis, consulting mechanical engineer and member of HPAC's board of consulting and contributing editors. This month he comments on several discussions of his earlier remarks about single pipe and two pipe steam heating systems published in September

RECENTLY, A READER of my "Page" made inquiry concerning a single pipe steam heating system, having in mind an invention which he believed would improve the operation and control of a steam radiator that was supplied and drained through a single, relatively large, pipe branch.

The particular feature of a single pipe system is that the steam and the water must travel in opposite directions in the same branch pipe and radiator valve, even though the steam and the condensate travel in the same direction within the main pipe that serves all branches. This inventor proposed to connect two pipes (one for steam and one for condensate) to the radiator from a rather elaborate valve-like device which, by the aid of heat-sensitive interior mechanisms, would separate the incoming steam from the outgoing condensate. Inspired by what impressed me as a rather costly complication, I paid my left-handed respects to single pipe steam heating in general on pages 115 and 116 in September.

As a result several friends of this method of heating have risen vociferously to count me as ignorant and reactionary [see "Open for Discussion" department this month]. Strangely enough, they all are from cities so distant from my own that one may assume the influence of local trade customs in our varying viewpoints. One correspondent on the west coast, however, does verify my statement that when steam and condensate must run counterflow through a single opening in a radiator, the valve controlling this opening must be opened to an adequate extent or there will be trouble.

He states that many oldtime one pipe gravity systems are operating satisfactorily, since "most of the tenants depend on the fireman to shut down the boiler when the day warms up" or just simply "open their windows if the radiator is still under steam and it becomes too warm in the room."

This statement seems to me to justify my suggestion of the desirability of a heating system in which the heat transmitting duty of each radiator can be adjusted manually in proportion to the degree of valve opening.

He thinks that it is "asking a lot" of a thermostatic or float trap on a radiator to perform successfully, year after year, with the amount of service attention they usually receive. I agree with this comment, but testify that the modern vacuum traps on radiators do perform year after year with great success and evidently do receive the small amount of maintenance that is required.

I described the basic operation of a two pipe steam heating system having an alternating receiver. My west coast correspondent tells of a single pipe steam heating system in a large store in which the elevation of the distant end of the steam main was so little above the boiler water level that during each cycle of gas burner operation the pressure within the main, due to rapid condensation of steam, caused water to rise from the wet return and partly to fill the remote end of the steam main.

The water thus employed necessarily was missing from the boiler, so that the automatic low water cutoff switch at the boiler stopped the gas burners. Without fire the pressure within the boiler and the main pipes quickly equalized and the water fell out of the main and re-entered the boiler. This restoration of normal conditions caused the automatic controls to re-light the fire, and this alternating continued indefinitely. To all intents and purposes, the flooded steam main and the automatic gas controls formed an alternating receiver. This testimony verifies my suggestion, however, in that the automatic control gadgets ultimately became weary and were relieved by an electric condensate pump.

A contractor friend, Mr. Costello on the east coast, states that single pipe steam heating systems do achieve comfort for the occupants of the buildings in which they are installed. I do not think that I denied this. Radiators generally are better than stoves, stoves better than fireplaces, fireplaces better than camp fires.

Constructive Suggestions

He makes constructive suggestions pertaining to small building heating; these ideas having nothing to do with single pipe or double pipe heat distribution, and I am glad to endorse them as follows:

1) The boiler is fired with an automatically controlled oil burner giving 11.25 percent CO_2.

2) The boiler is insulated with 2 in. thick magnesia blocks.

3) The chimney is inside the building, presumably so located as not to cause overheating of the adjacent rooms.

4) Excellent modern adjustable radiator vent valves are used.

Provided that the single pipe

steam heating system is in a comparatively small structure, with thermostatic temperature control, the thermostat accessible through always-open doors so that all radiators can influence the thermostat, reasonable comfort of course may ensue. My correspondent implies, however, that radiators in isolated rooms somehow will heat partially or completely, according to the weather, age of the occupant, angle of the sun or other influences, if the long-absent steamfitter has placed on the radiator an adjustable orifice vent valve. He fails to clarify who shall take over the duty of readjusting the orifice in this vent valve and I think leaves us with the necessity of opening the window to prevent overheating, since we can succeed not at all by partial closing of the steam return valve, but only invite water hammer by such procedure.

Another correspondent—also from the east coast—thinks that I never heard of an adjustable orifice radiator vent valve. My reply is inability, through my ignorance and 50 years' experience, to glean how this method of control can keep windows from being opened in rooms that are closed-off from the general building, and how to make the adjustable orifice valve do anything about keeping the windows closed when the room gets warm if the single pipe radiator is connected to a steam main that always has steam pressure available.

Forty years ago, when I commenced operating in Massachusetts and New York, the almost universal steam distributing system in Illinois was by single pipe radiator connections. I found great prejudice against this seemingly rough western scheme in the east, where a two pipe system with a separate return sealed below the boiler water line was nearly universal. Now, having advanced through the years to what I believe is a more liberal and conservative position, these comments from New York and Maryland suggest that the former western heresy of a single pipe system has achieved valiant defenders.

SMOKESTACK REINFORCED BY WELDING

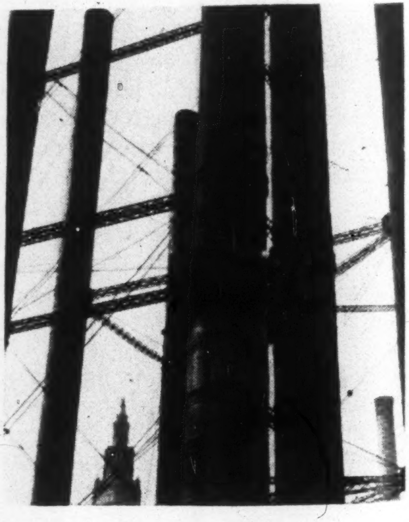
As part of the modernization of the Canal Rd. central steam heating plant of the Cleveland Electric Illuminating Co., a smokestack was reinforced by welding steel plates to the steel shell from the foundation of the stack up to a 60 ft height. The top part of the stack, which is 120 ft high, was similarly reinforced several years ago.

The shell was covered with ¼-in. steel plate, cut and rolled so that four sections of plate would circumscribe the 7 ft, 6 in. diameter of the stack. The joints were bevelled 60 deg and the sections were welded together with shielded arc electrodes, each joint being made first with a stringer pass and then with a weaving bead.

The new exterior was then covered with red lead and black corrosion resisting paint.

The Mertz Co., Cleveland, was in charge of the repair.

Two welders are shown on scaffolding simultaneously welding new steel plates to the steel shell of a 120 ft smokestack, the welds coming in right over the existing rivet heads (Courtesy Lincoln Electric Co.)



Warns of a Danger in "Mass Education"

Dr. Karl T. Compton, president of the Massachusetts Institute of Technology, declared last month there was danger of America's vast program of higher "mass education" producing a mass level of education that would prevent the best development of real genius and leadership in this country.

Addressing the graduating classes of the Carrier Institute of Business, which is operated by and exclusively for the employees of Carrier Corp., he said:

"Many American scientists and other scholars have been concerned over the fact that so many great ideas, which have revolutionized science and thought, have been coming from scholars in foreign countries where mass education is not the rule.

"I think that this is not an argument against mass education but it is a warning that mass education must not be permitted to prevent, by the swamping force of numbers, the providing of exceptional opportunities for the development of genius and leadership among those young people who show really great promise."

He pointed out that there were now more than 2,300,000 students in colleges, universities, and professional schools in the United States—more than 20 times as many as in Great Britain in proportion to total population. America's program, he said must be supplemented by continual emphasis on still higher education for a few. Such an idea, he asserted, was "not contrary to democratic principles."

Carrying this forward into business, he stressed the need for developing new ideas and for research. He listed as two fundamentals appropriate rewards for those who furnish the capital, and the setting up of facilities "for forward looking research and development, else the enterprise will ultimately die of obsolescence and stagnation.

"The eyes of the investor must not be glued on the balance sheet of the current year's operations," he said. "Planning for the future must accompany operation for the present. New ideas must be developed while old ideas are being capitalized and exploited. As much attention must be given to training personnel for future operations as is given to the handling of personnel in the current work."

New Pushbutton Panel Centralizes Mixing Operation, Aids Efficiency

Kodak Process "Easy as Stirring Cake"

A PUSHBUTTON control system for mixing photographic solutions in 1000 gal batches is used by the Eastman Kodak Co., Rochester, N. Y. The new method enables company technicians to compound tons of chemicals "as simply as a housewife whips together a quart of cake batter." Kodak engineers designed the system.

Previously, photographic solutions were mixed in much smaller quantities—about 200 gal—and several separate operations were necessary at various locations. The new system centralizes the process, provides increased production capacity, and steps up the efficiency of controlling the uniformity and quality of the solutions.

By operating various valves and levers at the control board, a technician is able to stir the solution, control the amounts of liquids pumped into the mixing tank, and drain the final solution into storage tanks. Dials and gages on the panel tell the operator at a glance the status of his "photographic recipe."

Two of the control board systems, one for developer and one for fixer solutions, have been put into operation at Kodak Park, Eastman plant which produces photographic film, paper, plates, and chemicals.

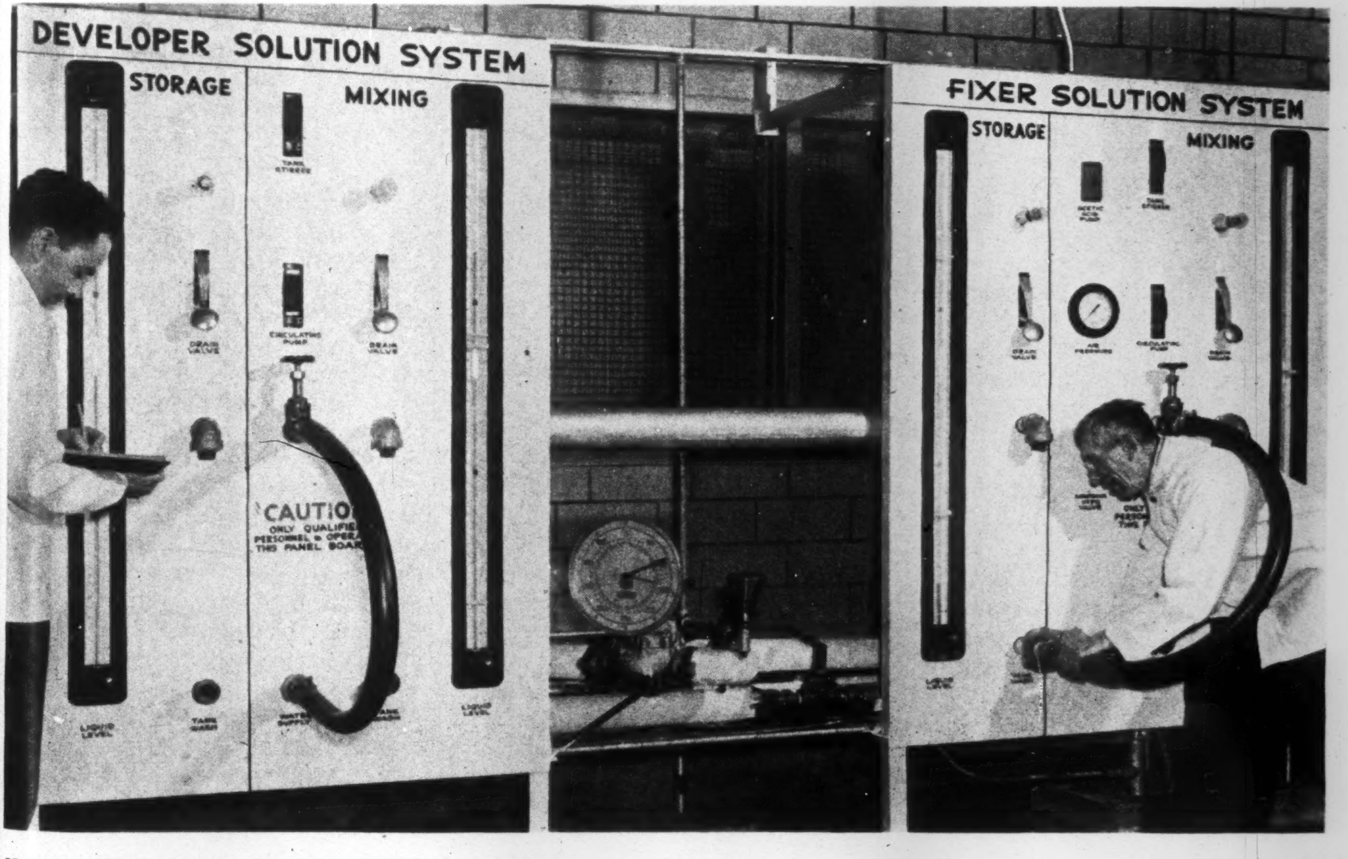
This is how a photographic solution is put together under control panel guidance:

1) Powdered chemicals, accurately weighed, are dumped through stainless steel hoppers into the 1000 gal mixing tank, which is on the floor below the control board.

2) Liquid ingredients for the formula are pumped into the tank by means of panel control valves.

3) Another lever starts a 5 hp mixer whirling in the tank.

4) After the "egg beater" step has been completed, the solution is filtered, then pumped into storage tanks. When laboratory tests have been finished and the solution pronounced satisfactory, the liquid is bottled and made ready for shipment.



These panels control the mixing of photographic solutions at the Eastman Kodak Co., Rochester, N.Y. Thomas McCabe (left) takes note of developer solution levels while Joseph Lavin connects a tank washing coupling on the fixer solution board. The new method enables Kodak to mix the solutions in 1000 gal batches

Gains Seen in 1948 Construction

John L. Haynes, chief, construction division, U. S. Department of Commerce: New construction in 1948 probably will reach $15.2 billion. This figure, a joint estimate of the Department of Commerce and the Department of Labor, represents a 20 percent gain over the $12,665 million expected in 1947. About three-fourths of the 1948 total, or $11,375 million, will be privately financed, the remaining $3825 million will be publicly financed, according to the government estimate. Private residential building (excluding farm) will again be the largest single component; it will be valued at $6 billion, an increase of 25 percent over the $4.8 billion total expected in 1947. Expenditures for private nonresidential building will rise slightly to $3250 million as compared with $3165 million in 1947. The probable increases in commercial building and in miscellaneous nonresidential building (churches, theaters, hospitals, etc.) will be largely offset by a sizeable decrease in industrial building. Farm construction is expected to run about $500 million in 1948, slightly more than 10 percent better than in 1947.

The greatest boost to privately financed nonresidential construction will come from increased expenditures for public utility enterprises. These will probably total $1625 million, as compared with $1315 million in 1947. The various public utilities, especially telephone, light and power, and gas, are striving to overcome the backlog of need created during the period of war restrictions and to expand commensurately with the large postwar demand arising from the high levels of industrial operation and of home building.

Most of the 1948 increase in publicly financed construction will stem from advances in nonresidential building, in highway construction, in sewer and water construction, and in conservation and development. Nonresidential building, reflecting large public hospital and educational programs, will probably reach $850 million as compared with $500 million in 1947. Highway construction is expected to advance 26 percent to $1.5 billion in 1948. Sewer and water construction is expected to total $375 million, and conservation and development $475 million, each registering a substantial gain over 1947.

* * * * *

F. W. Dodge Corp.: A 7 percent gain in construction contracts in 1948 over the actual volume reported for 1947 in the 37 states east of the Rocky Mountains is estimated. The total amount estimated for 1948 is $8,035,000,000 against a volume of $7,525,000,000 reported during the first nine months of 1947 plus an estimated volume for the last quarter of 1947. A 9 percent gain in nonresidential construction, a 4 percent gain in residential contract letting and a 7 percent gain in heavy engineering works over the 1947 record are estimated. The largest percentage gains in the major construction classifications for 1948 are expected in hospital and institutional building, with expectation of a 70 percent gain in 1948, social and recreational building, up 36 percent, and public buildings, up 29 percent. Dollar volume of single family and two family residential structures is expected to exceed the 1947 record by 1 percent, with a 14 percent gain in apartment house awards. The only major classification for which a decline is expected in 1948 is in manufacturing buildings, for which a drop of 14 percent is estimated.

* * * * *

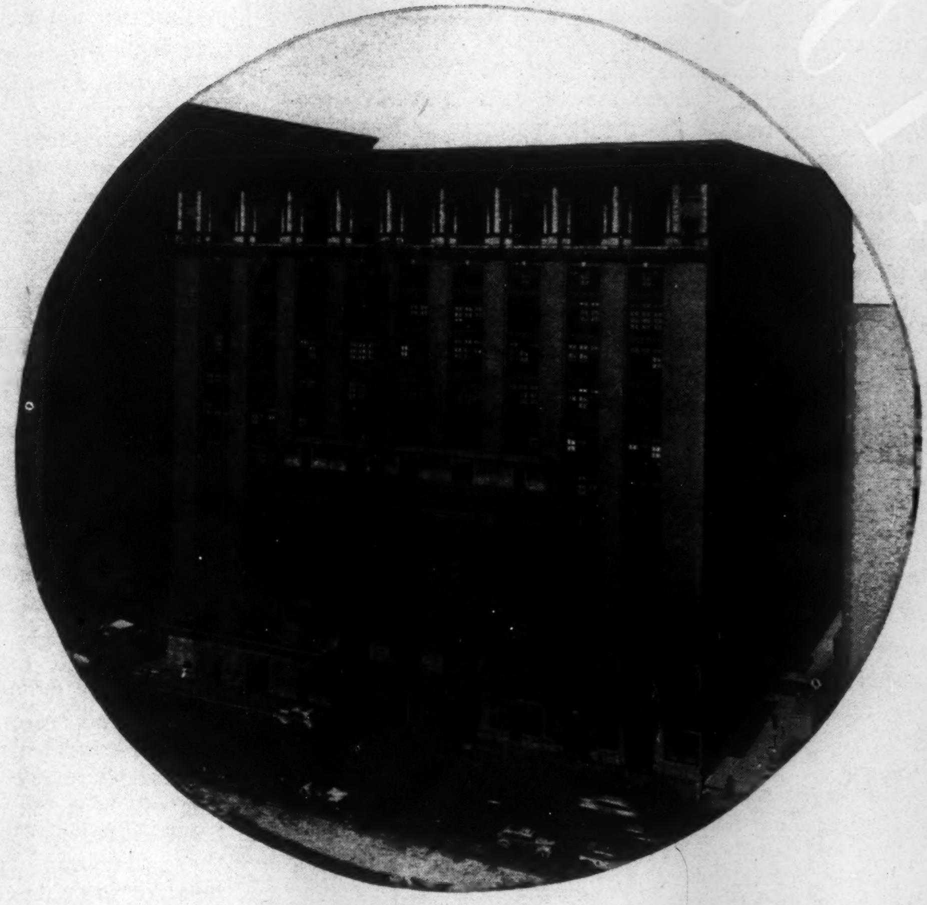
David S. Miller, president, Producers' Council: Expenditures for maintenance and repair of existing buildings are expected to total about $6 billion in 1948 or about the same as in 1947. With repair work included, the total volume of all building in 1948, including new construction, is expected to approximate $20 billion. Prior to the war, the largest amount spent for repairs and maintenance in any one year was $3.6 billion in 1929.

Public works and other government financed construction is expected to account for more than half of the anticipated increase in the volume of new construction in 1948. Public construction is estimated at about $3.8 billion, an increase of 30 percent over the 1947 total. At that rate, the volume of publicly financed construction would account for 27 percent of all new building which is estimated at $14 billion for the year. Public construction will account for about 24 percent of all new building in 1947 and totalled 22 percent in 1946. A slight decline is anticipated in the volume of publicly financed residential building, but expenditures for non-residential projects such as schools, public hospitals, recreational facilities, and administrative buildings are expected to rise to $775 million, an increase of 52 percent. Other public construction, including sewage disposal, water supply, conservation and development work, and airports should increase about 29 percent in value, according to the forecast. A gain of about 5 percent is estimated in military and naval construction. All values are expressed in terms of costs prevailing in October 1947.

* * * * *

Douglas Whitlock, chairman, Building Products Institute: About 200,000 additional workers will be needed in the construction industry in 1948 to permit an anticipated increase of about $1.5 billion in the volume of new building. The expected increase in the amount of construction put in place will not require a corresponding increase in the labor forces. In the first place, there have been encouraging signs of increased productivity of construction workers at the building site and these improvements are expected to continue during 1948. Secondly, the expansion of highway and heavy engineering construction, which represents a large portion of the expected increase in total building activity next year, will not require skills ordinarily used in residential and other building.

SHOW SECTION



New York City

February . . . . 2 to 6

Air Conditioning Exposition—Eighth International Heating & Ventilating Exposition . . . . 54th Annual Meeting of the American Society of Heating and Ventilating Engineers

5

Busy Week in New York Next Mont

New York City will be the center of interest for all concerned with heating, ventilation, and air conditioning during the week of February 2, for on that day the first session of the 54th Annual Meeting of the American Society of Heating and Ventilating Engineers will be called to order at the Hotel Commodore, and the Air Conditioning Exposition—the Eighth International Heating & Ventilating Exposition—opens its doors to the exhibits of nearly 400 different equipment manufacturers at Grand Central Palace.

This special Show Section has been assembled as a service to the readers of Heating, Piping & Air Conditioning—thousands of whom are expected to attend these two events—to give complete information on the exhibitors at the exposition, the products to be displayed, names of those in attendance at the booths, the meeting program of the ASHVE, and other items of interest. Those who will be in New York will find these listings of help in advance planning of their time there; those who cannot attend the exposition and the meeting will want to check over the descriptions of the products to be exhibited to be up-to-date on 1948's heating, ventilating, and air conditioning equipment.

Preliminary ASHVE committee meetings will be held in advance of the regular business and technical sessions and the New York Chapter's committee on arrangements is planning to welcome the early arrivals with some special entertainment features.

The first session of the ASHVE meeting will open at 9:30 a.m., Monday, February 2, in the ballroom of the Hotel Commodore; following it a welcome luncheon will be held, with the president of the New York Chapter, M. C. Giannini, as toastmaster. The speaker will be the Hon. Hugo E. Rogers, president of the Borough of Manhattan.

At 2:00 p.m. on Monday the exposition will open at Grand Central Palace and during that afternoon the ASHVE chapter delegates will hold their first meeting.

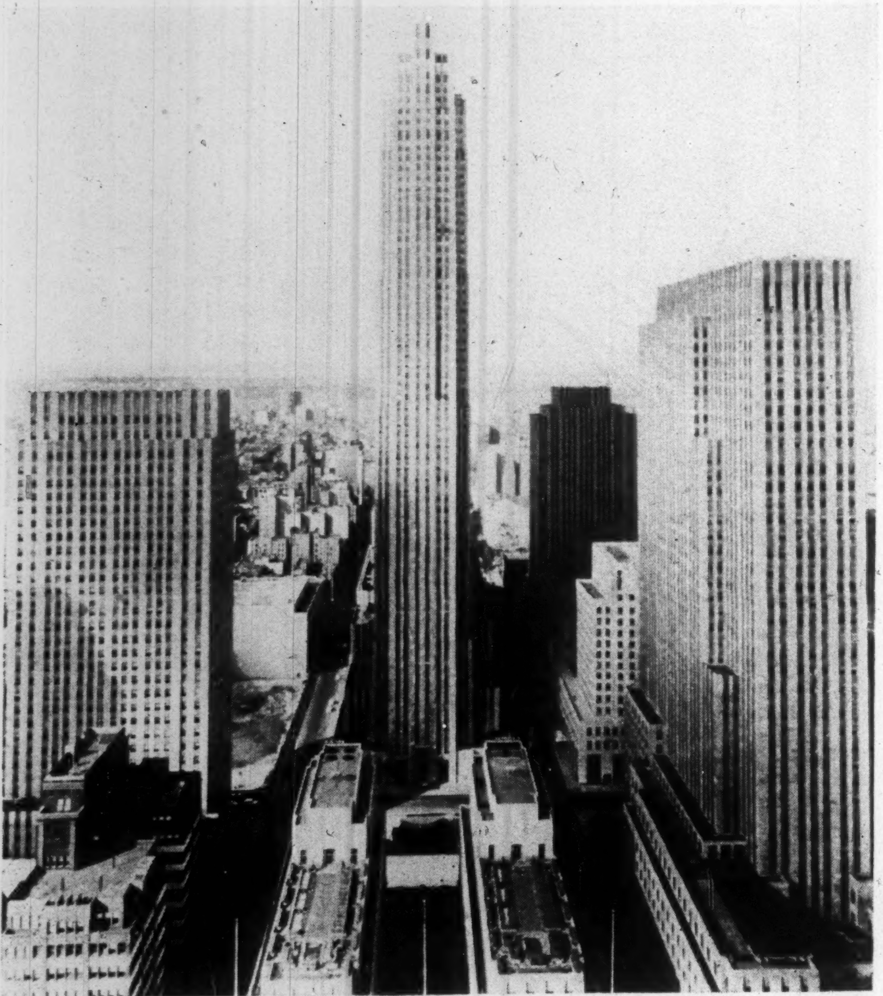
Technical sessions will be held morning and afternoon on Tuesday and Wednesday, and Thursday morning, with discussions of such important subjects as fire control methods in air conditioned buildings, research studies on air distribution and duct friction, and a review of ASHVE research.

Panel heating will be one of the popular subjects, and the measurements of solar heat transmission through glass and periodic heat transfer of wall surfaces are on the agenda. Suggestions for new test methods for air filters, a proposed method of selecting design temperatures, and the use of weather data will be the subjects of several papers.

One of the highlights of the ASHVE meeting will be a symposium on the use of the heat pump for year 'round air conditioning.

There is every indication that this will be a big meeting, but the housing bureau has advised that there are ample rooms still available for assignment.

For the entertainment of visiting members, there will be a special program to appeal to the ladies which will include sightseeing trips, theater and broadcast shows, a fashion show, and special trips to the Museums of Modern Art and the City of New York, and other points of interest. Some of the



One of the "sights of New York" you won't want to miss—if the busy sessions of the ASHVE meeting and the Exposition leave any time for sightseeing—is the Rockefeller Center development

Baldwin M. Woods is President of ASHVE

G. L. Tuve, the ASHVE First Vice President

special services to be given to members who attend will be information about concerts, movie programs, and the theaters, night clubs, restaurants, transportation arrangements and reservations, a shopping service for "the men who didn't bring their wives," and information about the time, place, and cost of places of special interest, athletic events, exhibits, art galleries, etc.

Social hours are planned for Monday evening which will provide for meeting old friends, musical entertainment and dancing.

The ASHVE past presidents will have their annual get-together on Tuesday evening and on Wednesday the annual banquet will be held in the grand ballroom of the Hotel Commodore. The toastmaster will be R. H. Carpenter and the speaker will be William B. Stout, engineer and inventor, whose subject will be These Human Miracles. Presentation of the past president's emblem will be made and there will be dancing after dinner.

Special forms for reservations for the various social events have been mailed to all ASHVE members.

The arrangements committee comprises:

W. E. Heibel, *General Chairman.*

Honorary Chairmen — Homer Addams, William H. Driscoll, Walter L. Fleisher, Dwight D. Kimball, Alfred J. Offner.

Vice Chairmen—P. B. Gordon, H. S. Johnson, C. F. Kayan, C. S. Koehler, H. J. Ryan.

Banquet—W. A. Swain, *chairman;* H. H. Bond, J. W. Booker, F. D. Lawrence, R. M. Nee, F. V. Self, B. F. Thomas, Jr.

Entertainment—Howard J. Rose, *chairman;* A. A. Bearman, J. C. Fitts, A. F. Hinrichsen, F. D. McCann, G. E. Olsen.

Exposition—C. F. Roth, *chairman;* O. W. Armspach, G. Donald Fife, J. C. Fitts, Ernst Graber, Miss Beatrice Hicks, W. C. Kruse, Jr., E. K. Stevens.

Finance — W. M. Heebner, *chairman;* H. W. Fiedler, *vice chairman.*

Ladies—H. S. Wheller, *chairman;* C. H. Smith, *vice chairman;* Mr. and Mrs. R. W. Cumming, Mr. and Mrs. H. B. Eells, Mrs. F. D. Lawrence, Mrs. Alfred Offner, Mr. and Mrs. T. R. Peyrek, Mrs. C. H. Smith, Mr. and Mrs. F. J. Swaney, Mrs. H. S. Wheller, H. S. Wheller, Jr.

Publicity—Clifford Strock, *chairman;* W. J. Osborn.

Reception—M. C. Giannini, *chairman;* W. A. Sherbrooke, *vice chairman;* P. D. Bemis, H. H. Bond, A. C. Buensod, V. J. Cucci, H. B. Hedges, C. S. Koehler, L. L. Munier, O. O. Oaks, S. R. Osborne, C. S. Pabst, E. J. Ritchie, Winfield Roeder, H. J. Ryan, Joe Wheeler, Jr.

Sessions—H. S. Birkett, *chairman;* L. D. Angell, S. R. Apt, G. C. Cummings, Albert Giannini, C. W. Hartmann, Harry Hartmann, H. J. MacKay, J. D. W. Robertson, J. E. Schechter, J. G. Skidmore.

Secretary—Carl H. Flink.

SHOW HOURS

The Air Conditioning Exposition—the Eighth International Heating & Ventilating Exposition—at Grand Central Palace, New York City, will open Monday, February 2, at 2 p.m., and daily from Tuesday through Friday at 12:00 noon. The closing hour is 10:30 p.m., Monday through Friday.

EIGHTH
Air Conditioning
Exposition
INTERNATIONAL HEATING & VENTILATING EXPOSITION
GRAND CENTRAL PALACE · NEW YORK N.Y.
FEBRUARY 2-6 1948

PROGRAM

54th ANNUAL MEETING
AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS
HOTEL COMMODORE, NEW YORK CITY, FEBRUARY 1948

SUNDAY, FEBRUARY 1

10:00 a.m. Technical Advisory Committee on Air Distribution and Air Friction

10:00 a.m. Technical Advisory Committee on Air Cleaning

1:30 p.m. REGISTRATION

2:00 p.m. Council Meeting

2:00 p.m. Technical Advisory Committee on Industrial Ventilation

MONDAY, FEBRUARY 2

8:30 a.m. REGISTRATION

9:30 a.m. BUSINESS SESSION—*Grand Ballroom*

Reports of Officers

Reports of Council Committees

Reports of Other Committees

Discussion of New Constitution and Bylaws

A Method of Fire Control, by A. C. Bartlett

State Laws Concerning Industrial Ventilation by K. J. Caplan and A. D. Brandt

12:15 p.m. Welcome Luncheon—*Grand Ballroom*

Toastmaster: M. C. Giannini, President, New York Chapter, ASHVE. Address by Honorable Hugo E. Rogers, Borough President of Manhattan

2:00 p.m. Exposition Opening — Grand Central Palace

2:30 p.m. Chapter Delegates Meeting

2:30 p.m. 1947 Committee on Research

2:30 p.m. Guide Publication Committee

2:30 p.m. Technical Advisory Committee on Air Sterilization

2:30 p.m. Technical Advisory Committee on Glass

2:30 p.m. Technical Advisory Committee on Sorbents

4:30 p.m. Technical Advisory Committee on Corrosion

5:30 p.m. Hospitality Hour (special ticket required)

7:00 p.m. Technical Advisory Committee on Cooling Load

7:00 p.m. Technical Advisory Committee on Fuels

7:00 p.m. Technical Advisory Committee on Heating Load

7:00 p.m. Technical Advisory Committee on Insulation

7:00 p.m. Technical Advisory Committee on Sound Control

9:30 p.m. The Shank of the Evening (special ticket required)

TUESDAY, FEBRUARY 3

9:00 a.m. REGISTRATION

9:30 a.m. TECHNICAL SESSION—
Grand Ballroom
Report of Tellers of Election
The Downward Projection of Heated Air, by Linn Helander and C. V. Jakowatz
The Discharge of Air from a Long Slot, by Alfred Koestel and G. L. Tuve
Friction Equivalents for Round, Square and Rectangular Ducts, by R. G. Huebscher
A Summary of ASHVE Research in Air Distribution and Ventilation, by Cyril Tasker

12:30 p.m. Luncheon Meeting—
Technical Advisory Committee on Panel Heating and Cooling

2:00 p.m. TECHNICAL SESSION—
Grand Ballroom
Measurement of Heat Output of One Square Foot of Panel, by R. S. Leigh and R. G. Vanderweil
Air Temperature Gradients in a Panel Heated Room, by J. M. Ayres and B. W. Levy
The ASHVE Panel Heating Research Program, by G. D. Winans
Periodic Heat Transfer at the Inner Surface of a Wall, by Harold A. Johnson

4:30 p.m. 1948 Committee on Research

4:30 p.m. Chapter Delegates Meeting

6:30 p.m. Past Presidents' Dinner

WEDNESDAY, FEBRUARY 4

9:00 a.m. REGISTRATION

9:30 a.m. TECHNICAL SESSION—
Grand Ballroom
Measurements of Solar Heat Transmission Through Flat Glass, by G. V. Parmelee, W. W. Aubele and R. G. Huebscher
Thermal Assessment of the Environment, by D. H. K. Lee
An Improved Test Method for Rating Air Filters, by R. S. Farr, W. N. Pauley and K. A. Crismon, M.D.
The 1948 Guide, by R. S. Dill

2:00 p.m. TECHNICAL SESSION—
Grand Ballroom
SYMPOSIUM—The Heat Pump for Year 'Round Air Conditioning
Economic and Technical Aspects of the Heat Pump, by W. E. Johnson
Heat Pump in an Office Building, by J. Donald Kroeker and R. C. Chewning
Research Aspects of the Heat Pump, by E. N. Kemler and N. Kulik
Operating Data on Heat Pump Installations, by M. M. Smith
Power to Operate These Heat Pumps, by Walter Herman

7:00 Annual Banquet—*Grand Ballroom*
Toastmaster: R. H. Carpenter
Speaker: William B. Stout
Subject: These Human Miracles
Presentation of Past President's Emblem

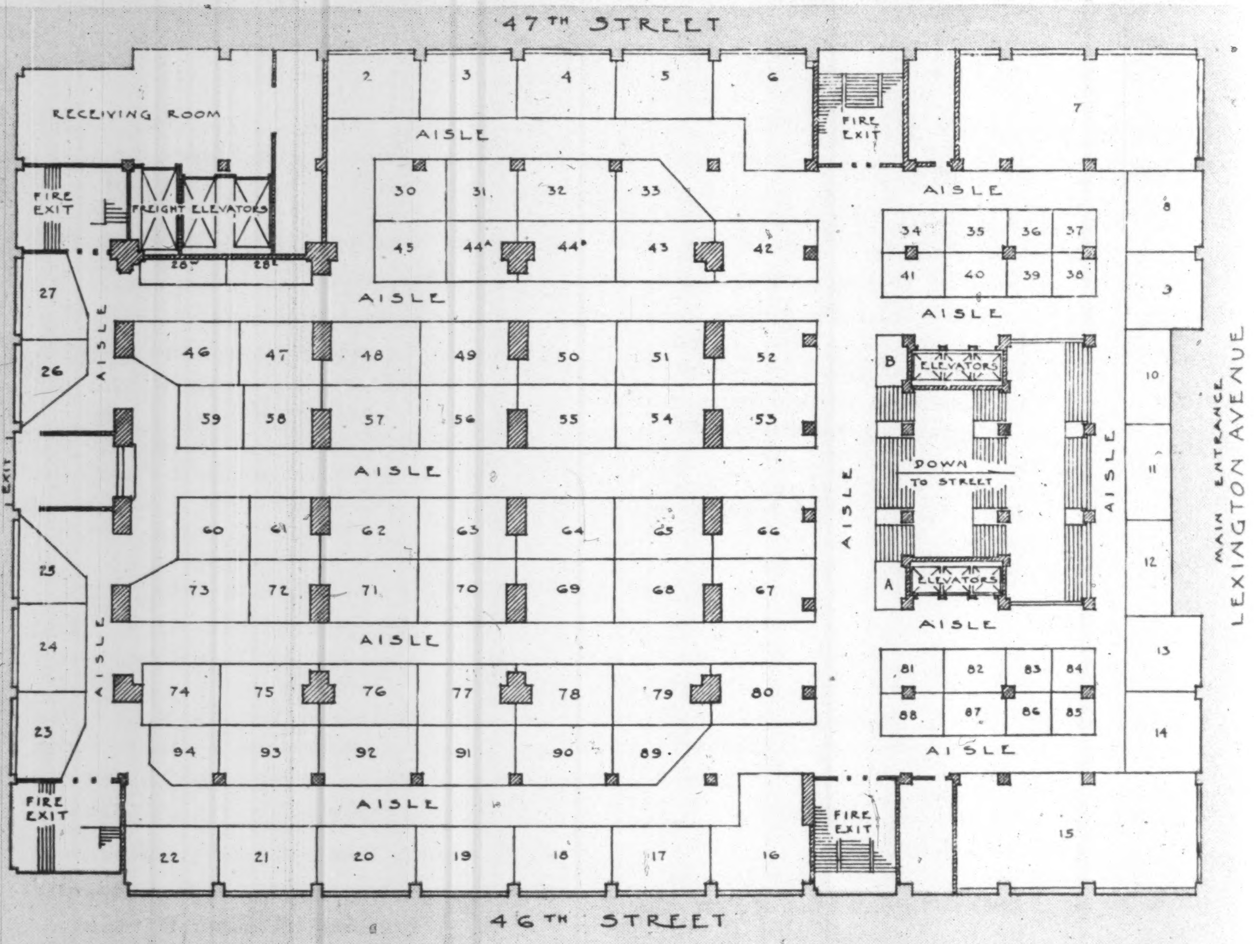
THURSDAY, FEBRUARY 5

9:00 a.m. REGISTRATION

10:00 a.m. TECHNICAL SESSION
West Ballroom
A New Method for Selecting Winter Design Temperatures, by C. M. Humphreys
Use of Climatological Data in Heating and Cooling Design, by H. E. Landsberg
Installation of Officers
Unfinished Business
New Business
Resolutions
Adjournment

12:30 p.m. Nominating Committee Luncheon

1:00 p.m. Council Meeting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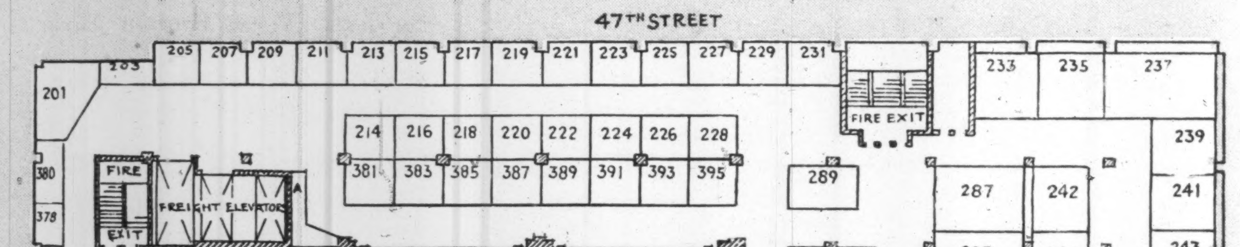
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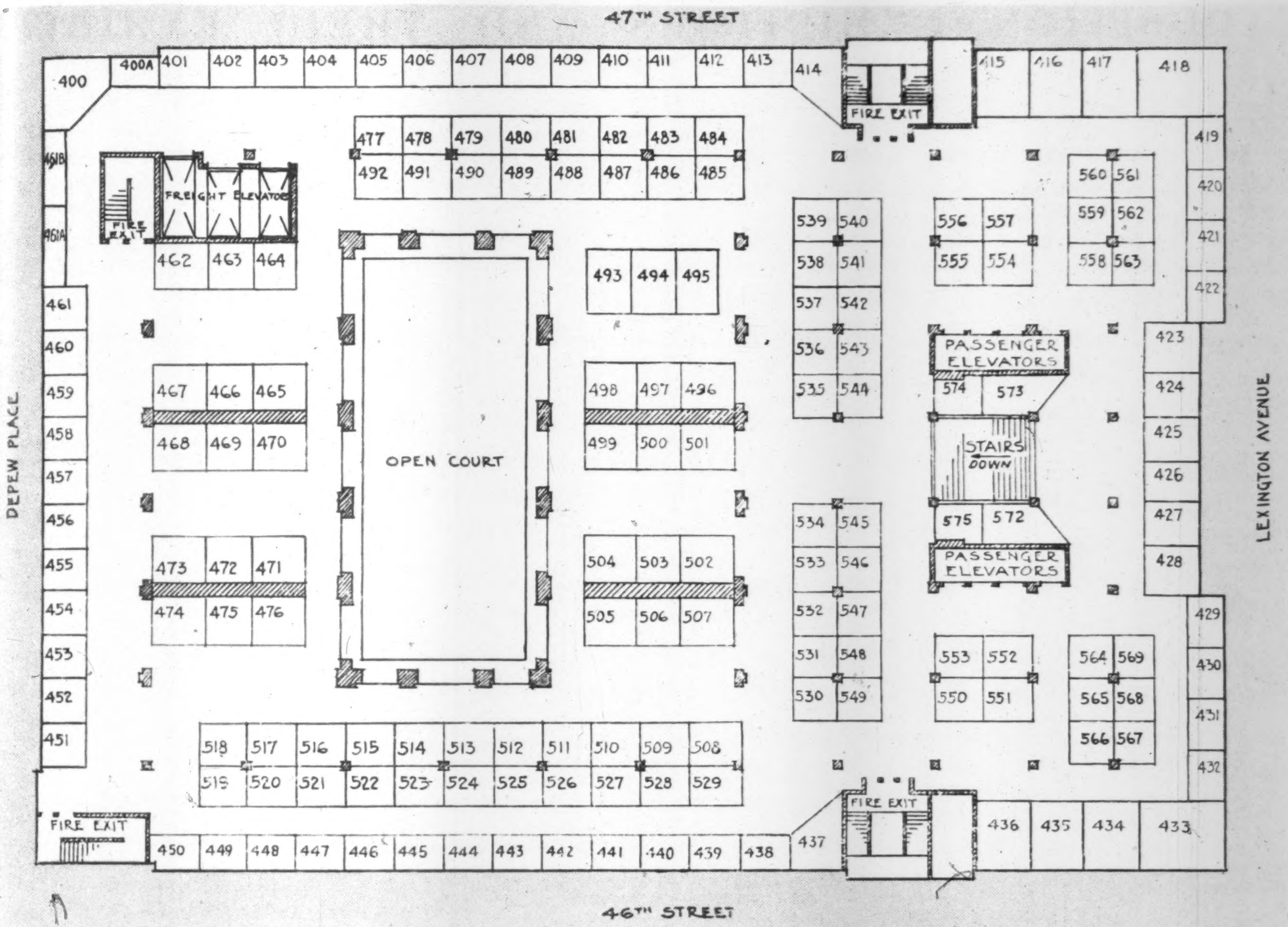
46TH STREET

EXPOSITION EXHIBITORS AND THEIR EXHIBIT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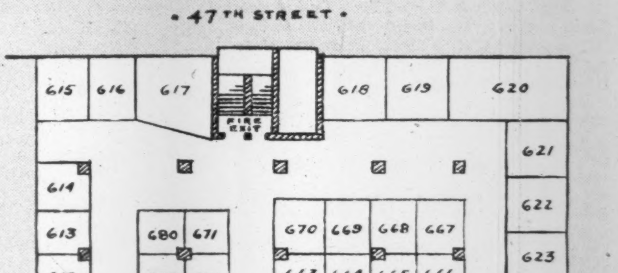
UPPER LEFT-MAIN FLOOR

LOWER LEFT-MEZZANINE

UPPER RIGHT-THIRD FLOOR

LOWER RIGHT-FOURTH FLOOR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Layout of the Four Floors of Exhibits

APRIL SHOWERS CO., 4126 Eighth St., N.

Seaholm, C. Vackert, W. C. Goldschmidt.

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EXPOSITION EXHIBITORS AND THEIR EXHIBITS

LISTED below are the names of the exhibitors who are scheduled for the Air Conditioning Exposition—Eighth International Heating & Ventilating Exposition, per latest advice at press time from the exposition management. Those listed with information on the products they will exhibit and the names of representatives who will be in attendance furnished these details direct to Heating, Piping & Air Conditioning. With the booth numbers and the accompanying diagrams of the exhibit hall, the location of each exhibitor can be quickly spotted.

The exposition is under the management of the International Exposition Co., Charles F. Roth, manager, E. K. Stevens, associate manager.

ACE ENGINEERING CO., 1435 W. 15th St., Chicago 8, Ill.—Booths 550 & 551.

In attendance: I. L. Schurman, J. W. Cowan, R. W. Bardach, A. L. Kohart, A. C. Beningson, C. I. Connolly.

Exhibiting: "Uniflow" horizontal rotary type industrial burner. Featuring stop drip valve (incorporating "for the first time positive shutoff of oil to prevent any after drip when equipment is not in operation"); brass manifold to simplify field piping of equipment burning No. 6 oil; full size cut-away model of direct drive "Uniflow" oil burner.

ACME INDUSTRIES, INC., Jackson, Mich.—Booths 558-559-560.

AEROFIN CORP., 410 S. Geddes St., Syracuse, N. Y.—Booth 233.

In attendance: M. Noble, L. A. Childs, George W. Barr, Walter E. Heibel, G. Donald Fife, L. C. McClanahan, George H. Cummins, Jim C. Chase, A. S. Ammerman.

Exhibiting: Heating and cooling coils which are representative of the exhibitor's regular production items.

AIR DEVICES, INC., 17 E. 42nd St., New York 17, N. Y.—Booths 412-413-414.

In attendance: C. N. O'Day, G. J. Sweeney, T. A. Hughes, W. F. Schraeder, R. W. Christie, C. A. Filiey.

Exhibiting: "Agitair" air and grease filters; circular, square, or rectangular diffusers; wind actuated exhausters; industrial furnaces. An improved, restyled square or rectangular air diffuser especially designed for acoustical ceilings, and a new aluminum circular diffuser, will be featured.

AIR FILTER CORP., 2514 W. Lisbon Ave., Milwakee 5, Wis.—Booth 518.

In attendance: Rodger J. Clark, Ray J. Schneiberg, George E. Joyce, Theodore Oser.

Exhibiting: Air filters for air conditioning and ventilating; grease filters for kitchen exhaust ducts and grease filter assemblies. The lint arrestor built into the "Aircor" air and grease filters will be featured.

AIR & REFRIGERATION CORP., 475 Fifth Ave., New York 17, N. Y.—Booths 427 & 428.

In attendance: Walter L. Fleisher, H. S. Dutcher, J. H. Burges, D. C. Lindsay, A. P. Schlafke, E. D. Benedetto.

Exhibiting: Self-contained "Capillary" unit conditioner; factory insulated panels for construction of enclosures, air plenum chambers, etc.; humidifying and dehumidifying equipment. A newly developed type of factory insulated paneling for use in air conditioning systems, the formation of temporary or permanent insulated chambers of all sizes and designs will be displayed for the first time. This paneling with the engineering service which accompanies it "can provide as much as 90 percent saving in field labor costs." It has been used for the formation of plenum chambers and enclosures forming part of air conditioning systems and also for the construction of small laboratory rooms and isolated conditioned areas.

AIR-MAZE CORP., 5200 Harvard Ave., Cleveland 5, Ohio—Booths 561-562-563.

In attendance: W. B. Watterson, N. L. Lamprecht, J. D. Thomas, O. W. Bochat, R. P. Walsh.

Exhibiting: Air filters and oil filters, featuring type "P-5" high velocity air filter.

AIRTEMP DIV., CHRYSLER CORP., 1119 Leo St., Dayton 1, Ohio.—Booths 46, 47, 58, 59.

In attendance: H. A. Malcolm, V. P. Black, W. C. Bartels, I. A. Eubanks, E. A. Ham, A. F. Ward, S. Anderson, W. B. Shirley, M. T. Bard.

Exhibiting: Packaged air conditioners, year 'round residential heating and cooling units, "EO-8" oil fired furnace for small homes, "BLF" oil fired boiler, gas and oil fired winter air conditioners, stoker, oil fired water heater, stoker fired water heater, commercial condensing unit, cutaway displays of various products. Packaged air conditioner features new grille work.

AIRTHERM MFG. CO., 700 South Spring Ave., St. Louis 10, Mo.—Booths 226 & 228.

In attendance: F. P. Kohlbry, Mrs. B. Bronemeier, N. B. Barsha, J. C. Watkins, Ray O. Reeves.

Exhibiting: Direct fired heaters, oil and gas; propeller fan type steam unit heaters; convector radiators; blower fan type steam unit heaters; steam coils. The convector radiators are a new product, having been added to the exhibitor's line of equipment within the past 90 days; made in three models, free standing, regular wall cabinet, and sloping top wall cabinet, and in a full range of sizes.

ALDRICH CO., Wyoming, Ill.—Booths 502-503-504.

In attendance: Earl L. Bedard, E. L. Fox, P. M. Stephenson, H. Hansell, Barney Mulder, Geo. Hench, F. H. Gallup, Sidney Goldstein, C. Rauch, J. J. Maschuch, A. R. Martino, Carl Staley, J. Leader, H. Varney, F. L. Hill, Paul Thomas.

Exhibiting: Oil burners, boiler-burner units for steam and hot water heating and hot water supply.

ALLIANCE MFG. CO., Lake Park Blvd., Alliance, Ohio.—Booth 471.

In attendance: John Bentia, A. E. Smith, H. J. Wilson.

Exhibiting: Electrical shaded pole motors for heating and ventilating.

ALSTROM CORP., 4184 Park Ave., New York 57, N. Y.—Booth 605.

AMERICAN AIR FILTER CO., INC., 215 Central Ave., Louisville 8, Ky.—Booths 18 & 19.

In attendance: J. R. McConnell, H. W. Pound, W. L. Gabbert, P. J. Keegan, H. J. Noles, C. D. Wright, W. M. Reed, W. G. Frank.

Exhibiting: "Electro-Airmat" precipitator, "Electro-Matic" precipitator, "Electro-Cell" precipitator, multi-duty filter, "PL-24 Airmat" filter, "Throway" filter, "M/W-2" and "M/W-4" filters, "Type G Drifilters," and featuring the "Electro-Kleen" precipitator—a new electronic precipitator for the home, which combines mechanical and electric precipitation to assure a high degree of air cleanliness under all conditions.

AMERICAN ARTISAN, 6 N. Michigan Ave., Chicago 2, Ill.—Booth 42.

In attendance: Frank P. Keeney, Chas. E. Price, John E. Peterson, Wallace J. Osborn, Robert A. Jack, James D. Thomas, George C. Cutler.

Exhibiting: Publication, technical books, and market data.

AMERICAN GAS ASSOCIATION, 420 Lexington Ave., New York 17, N. Y.—Booths 7-15.

In attendance: Clifford E. Hall, Gloria Gaupp, Marilyn Malloy.

Exhibiting: Gas fired heating equipment of several manufacturers.

AMERICAN MFG. CO., Jewell Ct., Hartford, Conn.—Booth 463.

AMERICAN MOHAWK CO., 580 Hudson St., New York City 14, N. Y.—Booths 526-527.

In attendance: Harry A. Toker, Harry S. Londa.

Exhibiting: Three models of pressure type oil burner.

AMERICAN RADIATOR & STANDARD SANITARY CORP., P. O. Box 1226, Pittsburgh 30, Pa.—Booths 2-3-4-5-6.

In attendance: D. D. Couch, H. L. Spindler, L. A. Kelly, Kenneth MacKenzie, H. C. Day, H. H. Steck, D. J. Quinn.

Exhibiting: Boilers, radiators, and miscellaneous accessories, featuring "Wyandotte" winter air conditioner (a gas fired winter air conditioner designed for installation in utility rooms, closets, or other locations in homes without basements), and baseboard radiant panels made of cast iron and available in two types, one providing radiant heat alone, the other combining both radiant and convected heat—they are 8 in. high and 2 in. thick, and replace regular baseboard "to become an integral part" of the room.

AMERICAN SOCIETY OF HEATING & VENTILATING ENGINEERS, 51 Madison Ave., New York 10, N. Y.—Booth A on main floor.

In attendance: Ralph F. Duysters.

AMERICAN STEEL & WIRE CO., 208 S. La Salle St., Chicago, Ill.—Booths 311-313.

AMERICAN STOVE CO., Lorain Div., 1200 Long Ave., Lorain, Ohio.—Booths 474, 475, 476.

In attendance: T. M. Sourbeck, J. M. Bayer, W. F. Jackson, C. B. Tozer, C. L. Wessel, G. R. Poole.

Exhibiting: Oil furnaces, gravity; winter air conditioning.

ANDERSON PRODUCTS, INC., 17 Tudor St., Cambridge 39, Mass.—Booth 642.

In attendance: Warren T. Ferguson, Kenneth G. Agnew, Kenneth B. Gerrish.

Exhibiting: "Vent-Rite" venting valves.

ANEMOSTAT CORP OF AMERICA., 10 E. 39th St., New York 16, N. Y.—Booths 16 & 17.

In attendance: John B. Hewett, V. Floyd Self, F. Honerkamp, L. R. Phillips.

Exhibiting: Standard "Anemostat" draftless air diffusers, featuring new adjustable type "C1" air diffuser and type "W" wall air diffuser.

APRIL SHOWERS CO., 4126 Eighth St., N. W., Washington 11, D. C.—Booth 270.
In attendance: Leonard H. Holder, Jean Holder, I. E. Leininger, Daniel Wright, M. Bigelow MacPherson, William Gray, James L. Hoyer, R. W. Pierce.
Exhibiting: Patented automatic roof cooling systems and new self-cleaning residence spray heads, featuring air cleaned automatic roof cooler spray heads.

ARMSTRONG MACHINE WORKS, Maple St., Three Rivers, Mich.—Booths 338 & 340.
In attendance: A. E. Armstrong, L. F. Armstrong, T. H. Rea, O. E. Ulrich, P. L. Wheeler.
Exhibiting: A glass model of the exhibitor's steam trap operating under 5 lb steam pressure; model of the exhibitor's humidifier operating under the same conditions; sectional models of foul gas purger.

AUSTIN, W. F., 5 Woodsedge Rd., Medford 55, Mass.—Booth 617.
In attendance: Wendell F. Austin.
Exhibiting: Air conditioning units, and possibly a line of oil burners. A direct fired air conditioning unit which will give a very good supply of hot water for domestic use the year around, without delivering any heat when thermostat is not calling for it, will be featured.

AU-TEMP-CO CORP., 521 Fifth Ave., New York 17, N. Y.—Booth 542.
In attendance: A. R. Herske, A. Fowler, D. Whittet, M. Marks, Miss E. Fine.
Exhibiting: Motorized valves and dampers, indoor-outdoor weather controls, electronic weather controls.

AUTO-HEAT CORP., 311 W. 66th St., New York 23, N. Y.—Booths 285-287.
In attendance: Otto B. Moody, William L. Whyte, G. Wesley Stone, M. T. Komornik, Ambrose Becker, David Ahearn.
Exhibiting: "Double-Duty" air conditioner, (warm air furnace with year 'round domestic hot water), steel water tube boiler for steam and hot water, standard oil burners, "Fireball" oil burner, oil burner for light oil, capacity to 30 gph.

AUTOMATIC DEVICES CO., 53 W. Jackson Blvd., Chicago 4, Ill.—Booths 229 and 231.
In attendance: Henry T. Kucera, Paul Olesen, William Wallin, Ed. Blyskal, John Cassidy.
Exhibiting: The "Weather-Man," full automatic control for regulating the heating of all types of buildings completely from "outside," and featuring "the extra advantages and features" of this control as applied to radiant panel heating systems.

AVCO MFG. CORP.—see SPENCER HEATER DIV.

BACHARACH INDUSTRIAL INSTRUMENT CO., 7000 Bennett St., Pittsburgh 8, Pa.—Booth 411.
In attendance: Rudolf Ulrich, B. H. Nunnally, John W. Smith.
Exhibiting: Service instruments for heating, air conditioning, and refrigerating industries, including indicating and recording thermometers, gas analyzers, draft gages, and electrical appliance testers.

BALTIMORE AIRCOIL CO., INC., 402 Colvin St., Baltimore 2, Md.—Booth 652.
In attendance: John Engalitcheff, Jr., Ray R. Forseille, D. A. Newton.
Exhibiting: 10 ton type "U" condenser—new model of centrifugal fan condenser featuring reversible fan section with angular discharge, reversible bottom section, extreme accessibility to all working parts (manufactured in sizes from 10 to 100 tons in increments of 5 tons); 10 ton type "CPE" propeller fan condenser—special development for outside installation featuring extreme accessibility, ease of maintenance, counterflow heat transfer, low horsepower consumption (manufactured in sizes from 10 to 50 tons in increments of 5 tons); liquid receivers.

BAUER & BLACK, DIV. OF KENDALL CO., 2500 S. Dearborn St., Chicago 16, Ill.—Booth 640.

BEAR MFG. CO., 2030 Fifth Ave., Rock Island, Ill.—Booth 501.
In attendance: J. H. Sullivan, R. L. Johnson, V. A. Nielsen, E. G. Nisonger, E. Ploss, E. Seaholm, C. Vackert, W. C. Goldschmidt.
Exhibiting: Static and dynamic balancing machines.

BEARLEE PRODUCTS CO., 1255 S. Monroe, Green Bay, Wis.—Booth 515.
In attendance: B. E. Colburn, W. S. Brede.
Exhibiting: Oil tank gages adjustable for all tanks 18 in. to 48 in. deep, new faucet gages for 55 gal barrels, "Storm-Pruf" vent caps.

BELL AND GOSSETT CO., 8200 N. Austin Ave., Morton Grove, Ill.—Booths 48 & 49.
In attendance: Frank C. Hackett, Ralph A. Patterson, R. E. Moore, C. E. Pullum, E. J. Gossett, W. A. Boone, John L. Shank, L. J. Smith.
Exhibiting: Hot water heating specialties, refrigeration components, centrifugal pumps. The "Airtrol" system, which automatically eliminates air from hot water heating systems using radiators, convectors or radiant coils, and the "Clean-A-Coil" valve, designed to keep coils of indirect heaters or side arm gas heaters free from lime and scale formation, will be featured.

BELTRAN ASSOCIATES, INC., 225 Lafayette St., New York 12, N. Y.—Booths 648-649.

BEST ENGINEERING CO., W. N., 90 West St., New York 6, N. Y.—Booth 639.

BIERMAN, DAN, 1 Star Sq., Long Island City, N. Y.—Booth 661.

BOGUE ELECTRIC CO.—See HOMEASE PRODUCTS DIV.

BORG-WARNER CORP.—see NORGE HEAT DIV.

BOSTON MACHINE WORKS CO., 7 Willow St., Lynn, Mass.—Booths 567-568-569.
In attendance: Ralph L. Dennis, H. Cutter Walters, I. M. Nelson, A. Torrisi, Jack Lair, Richard Halberg, Lars E. Schulein, Mr. Moran, Mr. Erickson.
Exhibiting: "Apthorp True Alignment" nozzles, "Instant-Glo" combustion chambers, "Clearview" oil tank gage, "Ideal" nozzle extractor, "Boston" chrome steel baffle, new "Boston Breese" burner for small homes.

BREUER ELECTRIC MFG. CO., 5100 N. Ravenswood Ave., Chicago 40, Ill.—Booth 653.
In attendance: L. C. Miles, Irwin Burton, A. S. Corte.
Exhibiting: "Tornado" and "Cyclone" furnace and boiler vacuum cleaners, blowers.

BROWN ELECTRIC CO., 98-11 65th Ave., Forest Hills, N. Y.—Booth 215.
In attendance: A. Brown, J. Wolfson, H. Bennett, H. Freidman, P. Berritt.
Exhibiting: Single and three phase electric motors, ignition transformers, automatic oil fired boiler burner (gun type), automatic oil fired hot water heater (pot type), automatic oil fired domestic hot water heater (gun type), automatic oil fired domestic hot water heater (pot type), oil burner for export trade only. 90 deg. BX connectors, slide type, will be featured.

BRYANT HEATER CO., 17825 St. Clair Ave., Cleveland, Ohio—Booths E 2-3-4 (in AGA exhibit).
In attendance: O. F. Habegger, M. H. Laundon, Paul Dow, J. N. Crawford, M. H. Traugott, R. D. Terhune, W. C. Wolff.
Exhibiting: Winter air conditioner, gravity furnace, floor furnace, gas boiler.

BUILDERS-PROVIDENCE, INC., 9 Codding St., Providence 1, R. I.—Booth 356.
In attendance: W. W. Adams, F. W. Deutsch, R. N. Fowler, C. K. Perkins, R. N. Perkins, D. J. Purdie.
Exhibiting: Primary steam, air, gas and liquid meters operated in conjunction with secondary electrical and cable operated recording instruments; "Propeloflo" liquid meter in a cutaway model tied in with a cable operated secondary instrument which records, totalizes or indicates, or all three, at distances up to 15 ft from the primary meter; cutaway model of a rate of flow indicator for water, steam or air—the "Flo-gage"; differential nozzles which can be inserted in pipe lines for measurement of flow; orifice plates and flanges; mechanical flow meter—the "Flo-Watch"—for indicating, totalizing or recording, or all three.

BURDEN CO., 1000 N. Orange Dr., Los Angeles 38, Calif.—Booth 650.
In attendance: E. J. Noble, J. M. Gale, G. M. Stevenson.
Exhibiting: Four vane overlapping type fan blades, three vane semi-pressure type fan blades, attic fan blade assemblies, blower wheels, axial flow fan assemblies, featuring electronic balancing equipment.

BURNHAM CORP., BOILER DIV., Irvington, N. Y.—Booths 242-244.
In attendance: A. E. Bastedo, V. A. Good, F. R. Brophy, C. M. Rapp, M. C. Cummings, A. W. Klein, E. Van Sise.
Exhibiting: "Base-Ray" radiant baseboards ("Hy-Power" and standard models), "Yellow Jacket" oil burning boiler, "Deluxe" oil burning boiler, slenderized radiation, and radiant radiator, featuring the radiant baseboards and a new boiler jacket.

CAMP, WM. & T., 224 Beverly Blvd., Los Angeles 4, Calif.—Booths 7-15.

CARGOCAIRE ENGINEERING CORP., 15 Park Row, New York 7, N. Y.—Booths 655-658.

CARNEGIE-ILLINOIS STEEL CORP., Pittsburgh 30, Pa.—Booths 311-313.

CARRIER CORP., 302 S. Geddes St., Syracuse 1, N. Y.—Booths 66-67.

CASTLE INDUSTRIES CO., Old Nepperhan Rd., Yonkers, N. Y.—Booth 469.

CATSKILL METAL WORKS, INC., Catskill, N. Y.—Booth 630.

CENTURY ENGINEERING CORP., 401 Third St., Cedar Rapids, Ia.—Booths 72 & 73.
In attendance: E. J. Lattner, M. D. McWilliams, R. P. Nessler, Keith Dunn, John Rosche, George Godrich, C. C. Thompson, A. H. Mellott, Paul Stoll, N. M. Edwards, Lowell Madden, Dave Lang, Jr., W. E. Haynes, Ray F. Considine.
Exhibiting: Oil burners, oil fired furnaces, and "High-boys;" oil fired boilers; oil fired water heaters. Featuring an entirely newly designed oil burner, newly designed "High-boy," newly designed hot water boiler and water heater.

CERTIFIED FURNACE CO., DIV. OF STAINLESS & STEEL PRODUCTS CO., 1000 Berry Ave., St. Paul 4, Minn.—Booths 528 & 529.
In attendance: B. Tooker, W. W. Roberts, R. Thorne, H. Marcus, A. E. Olson, S. T. Carlson, L. Yates.
Exhibiting: Oil fired and gas fired furnaces; coal fired square cased gravity furnace, which is being introduced; gas conversion burner.

CHACE CO., W. M., 1600 Beard Ave., Detroit 9, Mich.—Booths 441-442.
In attendance: H. B. Trix, J. A. Kienle, J. C. Schwab, C. F. Alban, H. D. Matthews.
Exhibiting: Temperature control elements made from thermostatic bimetal.

CHELSEA FAN & BLOWER CO., INC. 1206 Grove St., Irvington 11, N. J.—Booths 633-634.
In attendance: W. J. Lohman, Jr., George J. Read, Chester H. Smiley.
Exhibiting: Industrial, commercial, and residential ventilating fans and blowers, featuring horizontal spring-mounted attic fan.

CHICAGO PUMP CO., 2336 Wolfram St., Chicago 18, Ill.—Booths 38-39-40.
In attendance: George D. Bers, Milton Spiegel, H. E. Martin, John E. Crain, L. M. Nechine, Ralph Carter.
Exhibiting: "Flush-Kleen," "Condo-Vac," "Sure Return" and other types of pumps, with a full scale "Flush-Kleen" pump in operation.

CHRYSLER CORP.—see AIRTEMP DIV.

CINCO DIV.—see F. C. RUSSELL CO.

CIRCULATORS & DEVICES MFG. CORP., 22 Rose St., New York 7, N. Y.—Booths 659 & 660.
In attendance: S. B. Camiel, G. Turin, R. Fagan, S. Sturman.
Exhibiting: Air circulators, exhaust fans, blowers, kitchen fans, attic fans, industrial fans, shutters. Featuring special industrial fans, new kitchen fans, new line of "Economy" fans.

CLEAVER-BROOKS CO., 326 E. Keefe Ave., Milwaukee 12, Wis.—Booths 91-93.
In attendance: E. L. Langley, J. V. Resek, Duane E. Kress, T. O. Gulliford, R. J. Tutsch, R. A. Buechner.
Exhibiting: 50 hp packaged steam generator; "Hev-E-Oil" conversion type burner.

CLERCOLD, INC., 400 W. 119th St., New York 27, N. Y.—Booth 434.

CLEVELAND STEEL PRODUCTS CORP.—see TORIDHEET DIV.

CLIMAX MACHINERY CO., 301 S. LaSalle St., Indianapolis 1, Ind.—Booth 609.
In attendance: M. H. Fuller, H. C. Thomas, A. D. Babcock.
Exhibiting: Room coolers, attic fan, evaporative coolers.

COLE-SEWELL ENGINEERING CO., 2288 University Ave., St. Paul 4, Minn.—Booth 541.
In attendance: H. J. Sewell, E. W. Laudert, I. E. Loring, S. H. Burt.
Exhibiting: Draft governors, draft "Korektors," "Sullivan" draft stabilizers, featuring dealer's display boards.

COLEMAN CO., INC., 250 N. St. Francis, Wichita 1, Kans.—Booths 241-243-245.
In attendance: R. W. Carney, A. Dean Olds, S. B. Campbell, Jack Kice, F. W. Richards, Harry Morton, L. L. Songer, L. L. White, and associates of the Philadelphia office.
Exhibiting: Floor furnaces (gas and oil), space heaters (oil), warm air furnaces (oil), domestic water heaters (gas and oil.) Featuring new model "Super-Performance" gas floor furnace with pressed steel, oven brazed burner having flared ports of stainless steel ribbon; console model oil space heater; LP gas domestic water heater; and the "Chimney Crown" —new flue cap of exclusive twin ring design.

COLUMBIA BURNER CO., 727 Ewing St., Toledo 7, Ohio.—Booths 7-15.

COLUMBIA STEEL CO., Russ Bldg., 235 Montgomery St., San Francisco, Calif.—Booths 311-313.

COMBUSTION CONTROL CORP., 77 Broadway, Cambridge 42, Mass.—Booths 472-473.
In attendance: John Long, Burton Shaw, L. D. Sibley, George Gale, representatives from all eastern offices and branch offices in Chicago and San Francisco.
Exhibiting: "Fireye" photoelectric flame failure safeguard for oil burners; electronic flame rod for monitoring gas ovens and gas pilot flames; programming control for programming automatic ignition, fuel pump, and valve systems on automatic oil and gas burning installations; boiler feedwater control and boiler low water level safeguard.

COMBUSTIONEER AUTOMATIC COAL BURNERS, DIV. OF STEEL PRODUCTS ENGINEERING CO., Springfield, Ohio.—Booths 489-490.
In attendance: A. R. Massman, M. W. Acheson, Burton Keim.
Exhibiting: Automatic coal stokers, showing the principle of the "breathing" fuel bed; humidifiers, a new product with special dual valve arrangement which eliminates overflowing and other special features; new oil burner, low pressure, with rotor type atomizing pump and positive displacement metering pump, along with inner and outer air cones "for most efficient combustion."

COMMERCIAL FILTERS CORP., 18 W. Third St., Boston 27, Mass.—Booth 507.
In attendance: E. W. Sherburne, J. M. Morrison, H. C. Corwin, E. J. Stanley.
Exhibiting: Filters for oil burners, truck tanks, and bulk delivery plants, featuring new designs.

CONCO ENGINEERING WORKS, Mendota, Ill.—Booth 237.
In attendance: Walter Sormane, J. B. Walton, L. N. Beardsley.
Exhibiting: Oil burners, oil fired winter air conditioners, oil fired boilers, gas fired winter air conditioners, coal fired winter air conditioners, coal stokers, "Conco-Breese" horizontal burners. The boiler-burner unit, furnace-burner unit, and the horizontal burner will be featured.

CONKEY & CO., H. D.—See CONCO ENGRG. WKS. and FIELD CONTROL DIV.

CONNOR ENGINEERING CORP., W. B., 114 E. 32nd St., New York 16, N. Y.—Booth 63.
In attendance: Henry A. Baker, Henry Sleik, Patrick J. Shea, Hugh T. Porter, Frederick H. Munkelt, Alfred J. Hamilton, Theodore L. Smith.
Exhibiting: "Dorex" air recovery and purification equipment; "Kno-draft" adjustable air diffusers.

CONSOLIDATED INDUSTRIES, INC., Lafayette, Ind.—Booths 32 and 33 and 632.
In attendance: W. W. Timmis, W. T. Winter, Robert Battle, H. M. Cooper.
Exhibiting: "Jetronic" oil space heater, oil floor furnace, oil burner, and oil burning furnace.

CONTINENTAL AIR FILTERS, INC., P. O. Box 1647, Louisville 1, Ky.—Booths 457 & 458.
In attendance: Wm. K. Gregory, A. S. Lewis.
Exhibiting: Automatic self cleaning air filter; "Whirlwind" oil bath air cleaner; dry filter (permanent frame, replaceable media); washable oil coated, permanent type filter.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.—Booths 209, 211, 213.
In attendance: J. L. Holloway, P. R. Mork, J. A. Dwyer, G. E. Hoffman, W. D. Howard, H. H. Simmons, P. R. Berryman, D. J. Molloy, Henry Kuhlman.
Exhibiting: Hot water boilers—coal, oil and gas fired; steam boilers—coal or oil fired; radiators; radiant baseboard panels; valves (brass); fittings (cast iron). A feature will be radiant baseboard panels installed on two sides of a simulated room, operated on hot water.

CROTTY MFG. CORP., 133-15 35th Ave., Flushing, N. Y.—Booths 543-544.
In attendance: Michael C. Crotty, A. C. Hart, M. Mintern, Ralph Sibilla, A. J. Polakoff.
Exhibiting: Complete line of domestic boilers; water walls; "Visco" fuel oil heater. The water wall, for boosting efficiency and capacity in existing boiler plants, will be featured.

CS BRASS MFG. CO., 148 W. 62nd St., New York 23, N. Y.—Booth 641.
In attendance: Manuel Bergman, Samuel Bergman, Frank Lynford, Nathan L. Davis.
Exhibiting: Copper tube fittings.

CUNO ENGINEERING CORP., 80 S. Vine St., Meriden, Conn.—Booth 409.
In attendance: J. A. Plummer, C. H. Winslow, R. H. Keane, together with sales office representatives from all territories.
Exhibiting: "Micro Klean" filter specifically designed for oil burner use.

CURTIS REFRIGERATING MACHINE DIV., 1905 Kienlen Ave., St. Louis 20, Mo.—Booths 278-280-295-297.
In attendance: H. C. Morrison, H. J. Nettler, K. T. Rockey, Geo. C. Helde, C. W. Stover, M. C. Jones, A. C. Kniseley, R. S. Graham.
Exhibiting: Complete line of packaged air conditioners, 3 through 15 hp, remote condensing units for use with designed air conditioning installations. Entire line has been redesigned and improved.

CYCLOTHERM CORP., 90 Broad St., New York, N. Y.—Booths 493, 494, & 495.
In attendance: Harper Holt, Aatto P. Saba, Charles Wiedrick, Victor N. Connors, Miss Judy Harding, Joseph W. Stephens, Peter Pottetti, Robert J. Ferdinand, Ben Muirhead, Carl A. Bovard, R. D. Chadwell, Mr. Squier, Paul de Samelson, W. F. Goddard, H. P. Sossomon, William Barrington, Jr., Luis de Luzuriaga, R. D. Emmons, W. C. Fletcher, C. F. Mally, W. G. Miller, C. O. Craighead, L. N. Dietz, E. Geppelt, S. B. Shrador, J. E. Crawford, C. S. Moore.
Exhibiting: Model "C 10L" gas fired generator, model "C 60L3" oil fired generator, feedwater pump set for model "C 10L" or "C 60L3," flame demonstrator, and featuring "General Furnaces" water heating coil demonstrator and "Cyclonic Flame" demonstrator, showing what actually takes place within a furnace and fire tubes of two pass package type steam generators.

DAVIS ENGINEERING CORP., 1064 E. Grand St., Elizabeth 4, N. J.—Booth 201.
In attendance: R. Lisson, Gil Fox, C. E. Bernard, William Drab, Larry Nigro, A. O. Jaeckel.
Exhibiting: New line of "Paracoil" "Freon" chillers, condensers, receivers; fuel oil heaters; water heaters (instantaneous, tankless indirect types).

DIELECTRIC PRODUCTS CO., INC., 125 Virginia Ave., Jersey City, N. J.—Booth 03.

DODGE CORP., F. W., 119 W. 40th St., New York 18, N. Y.—Booths 400-400A.
Exhibiting: Publications and services.

DOLE VALVE CO., 1901 Carroll Ave., Chicago 12, Ill.—Booths 220-222-224.

DOLLINGER CORP., Rochester 3, N. Y.—Booths 522-523.

DOMESTIC ENGINEERING, 1900 Prairie Ave., Chicago 16, Ill.—Booths 28 W & 28 E.
Exhibiting: Publication.

DOWAGIAC STEEL FURNACE CO., Dowagiac, Mich.—Booth 461A.

DOYLE VACUUM CLEANER CO., 225 Stevens, Grand Rapids, Mich.—Booths 346-348.
In attendance: D. I. Doyle, Sr., D. I. Doyle, Jr., Bruce Henderson, L. F. Hodgins, S. C. Knapp, P. E. Doyle.
Exhibiting: "Grand Rapids" furnace cleaners.

DRAVO CORP., 300 Penn Ave., Pittsburgh 22, Pa.—Booths 87 & 88.
Exhibiting: "Counterflo" direct fired heater.

DUO-THERM DIV., MOTOR WHEEL CORP., Mount Hope and Washington, Lansing 3, Mich.—Booths 89 & 90.
In attendance: A. R. Frantz, Theo Valjean, G. H. Phillips, R. H. Reeder, E. M. Crary, D. F. Jones.
Exhibiting: Fuel oil burning space heaters, automatic oil burning water heaters, automatic gas water heaters, oil burning furnaces. This will be first official showing of brand new automatic gas water heater line, and exhibit will also include a special display cutaway of the furnace.

DWYER MFG. CO., F. W., 317 S. Western Ave., Chicago 12, Ill.—Booth 299.
In attendance: J. G. Dwyer, F. W. Dwyer.
Exhibiting: New CO_2 indicators, draft gages, manometers, pitot tubes, new smoke gages.

EAGAN CO., WALTER H., 2336-38 Fairmount Ave., Philadelphia, Pa.—Booths 648-649.
Exhibiting: Condensate, boiler feed, vacuum, turbine and centrifugal pumps.

EAGLE-PICHER SALES CO., 420 Lexington Ave., New York 17, N. Y.—Booths 487-488.
In attendance: William V. Steers, William D. Brooke, L. F. Hosley, J. M. Ruston, E. H. Sharp, Glen J. Christner.
Exhibiting: Industrial materials; "home conditioning" products, including home insulation, aluminum combination storm windows and screens, louvers, air changers, caulking compound, aluminum combination storm door and screen.

ECKHART MFG. CO., 470 First Ave. West, Roselle, N. J.—Booth 247.
In attendance: Arnold Eckhart, Sr., Arnold Eckhart Jr., Hilmer F. Rodler, Victor S. Radlinski, Wooley M. Croker, Albert C. Masche, Frank L. Smith, Harry E. Hoagland.
Exhibiting: Conversion oil burners; catalytic oil burning head; forced warm air furnaces. The catalytic head, which has been added to the regular line of conversion type oil burners, will be featured.

EFFECTO GRILLE CO.—see TURNBULL MFG. & DISTRIBUTING CO.

ELECTROMODE CORP., 45 Crouch St., Rochester 3, N. Y.—Booths 644-645.
In attendance: T. J. Oliver, R. E. Pequignot, T. B. Owen, H. J. Lindsay.
Exhibiting: All-electric room heaters, space heaters, and furnace.

ELECTRO SPECIALTY MFG. CO., INC.—see NATIONAL HOME EQUIPMENT CO.

EMPIRE STOVE CO., 918 Freeburg Ave., Belleville, Ill.—Booth 572.
In attendance: L. A. Brand, J. D. Qualey, Geo. R. Strode, J. Jos. Spelman, Floyd J. Connors, Alfred R. Johnson.
Exhibiting: Gas floor furnaces and gas circulator heaters, and featuring new "Thriftmatic" gas burner which "requires no field adjustment."

ENTERPRISE ENGINE AND FOUNDRY CO., 18th & Florida, San Francisco 10, Calif.—Booths 483-484.
In attendance: James F. McIndoe, James M. Pidgeon.
Exhibiting: Industrial and fully automatic oil burners.

EVER-TITE COUPLING CO., INC., 254 W. 54th St., New York 19, N. Y.—Booth 575.
In attendance: Herbert J. Krapp, James E. Jordan, Miss Grace Mullins, John T. Krapp.
Exhibiting: Quick couplings.

FAIRBANKS CO., 393 Lafayette St., New York 3, N. Y.—Booths 269 & 271.
In attendance: A. L. Naylor, R. G. Macbeth, C. L. Haslup, E. T. Flanagan, W. T. Rogers, J. C. Valentine, A. W. Hoogs, P. Massagli, U. F. Unmuth, G. P. Leckler, R. A. Fournier, E. Zittel, E. J. McVey, R. W. Nickerson, C. E. Thyng, A. T. Wendler, W. F. Guthrie, G. E. Ford, E. T. Adams.
Exhibiting: Bronze and iron body valves, angle valves, globe valves, gate valves, check valves, blowoff valves; A. P. cocks, "Silbraz" joint valves, fire protection valves, sprinkler system valves, underwriters' approved valves, steam valves, water valves, gas valves, oil valves; malleable iron pipe unions; malleable iron fittings.

FAIRBANKS, MORSE & CO., 600 S. Michigan Ave., Chicago 5, Ill.—Booths 78-79.

FAIRFIELD OIL HEATING CO., INC., 106 Mason St., Greenwich, Conn.—Booth 420.
In attendance: Charles T. Robinson, Joseph Smeriglio, K. E. Stevens.
Exhibiting: Domestic oil burners.

FARR CO., 2615 Southwest Drive, Los Angeles 43, Calif.—Booths 265-267.
In attendance: F. X. Shea, W. H. Welty, R. S. Farr.
Exhibiting: Air filters, air washers, humidifiers. Ping-pong ball test setup to determine efficiency of a "Far-Air" filter will be featured.

FEDERAL BOILER CO., INC., Granite & West Sts., Midland Park, N. J.—Booth 638.
In attendance: James H. Legg, Robert McTaggart, Ray Bohr, Ray Shuster, Roy M. Rathe, Ed Teller, Mr. Schlomer, Harold Zwerdling, Ralph Meshel, Harry Hoffman, Louis Hoffman, Harold Young, Eric Adams.
Exhibiting: Steel boiler, complete with a jacket and hot water heating coils, featuring new compact boiler rated at 320 sq ft on steam and 510 sq ft on hot water.

FIELD CONTROL DIV. OF H. D. CONKEY & CO., Mendota, Ill.—Booths 266-268.
In attendance: C. W. Potter, R. A. Friestad, James Burch, Fay Kinne, Russel Glass, George Peterson, Harry Glou, Howard Watt.
Exhibiting: Barometric draft controls, featuring new "R" series and new "Barochek."

FIRELINE STOVE & FURNACE LINING CO., 1800 Kingsbury St., Chicago 14, Ill.—Booth 35.
In attendance: Daniel J. Quinnan.
Exhibiting: Stove and furnace lining (for warm air furnaces, heating stoves, etc., "Ironset" asbestos furnace cement for setting and resetting furnaces); "Firelite" insulating refractory (for oil burner combustion chambers, etc.); "Fire Hearth" castable refractory (for stoker hearths, precast combustion chambers and baffles, etc.)

FITZGIBBONS BOILER CO., INC., 101 Park Ave., New York 17, N. Y.—Booths 56-57.
In attendance: Ray C. Malvin, Gustav E. Olsen, John R. Collette, Oscar F. Noss, Gilbert Nelligann.
Exhibiting: "400" and "80" series, and "D" type, steel boilers; "Directaire." A new line of residential steel heating boilers for all fuels will be displayed for the first time.

FOREST CITY FOUNDRIES CO.—see NIAGARA FURNACE DIV.

FRIGIDAIRE DIV. OF GENERAL MOTORS CORP., 300 Taylor St., Dayton 1, Ohio—Booths 401, 402, 403, 404.
In attendance: W. F. Switzer, A. C. Freimann, M. C. Schenk, C. F. Wood, H. E. Martin, R. Woodward, J. E. Boyer, R. H. Huston, W. F. Layer, Insco Williams, F. R. Rice, W. R. Rodgers, J. T. Collins, L. A. Biegen, T. A. Armino, J. B. Nohstoll.
Exhibiting: Condensing unit (water cooled, four cylinder vertical, with 10 hp motor); "Multipath" air conditioning units for central systems; new central system air conditioner (vertical packaged unit); new self contained air conditioner (packaged unit for stores, restaurants, etc.); new room conditioner; new commercial "Meter Miser" refrigerating unit (will be hooked up and operating cooling coil to form frost-ball); water cooler (in operation). Commercial "Meter-Miser" construction demonstration will be featured—this includes all major parts that go to make up a complete refrigerating unit of rotary design, and the complete mechanism will be assembled step-by-step in a special demonstration for visitors.

FUELOIL & OIL HEAT, 232 Madison Ave., New York 16, N. Y.—Booths 225-227.
Exhibiting: Publication.

FULTON SYLPHON DIV., ROBERTSHAW-FULTON CONTROLS CO., Knoxville 4, Tenn.—Booths 303-305-307.
In attendance: W. M. Hajeck, L. S. Dysert, F. G. Cross, E. D. Rogers, King & Shepherd.
Exhibiting: Temperature controls for heating, ventilating and air conditioning, featuring models showing operation of "Hot-Chamber" type regulators.

GELERT CO., C. R., 35 N. Raymond Ave., Pasadena 1, Calif.—Booth 662.
In attendance: C. R. Gelert, Wm. W. Short, George F. Bertrand, Laurence Trant, James Mc G. Means, John A. Dodd, Wm. G. Holems, K. D. Breitigan.
Exhibiting: "Air Jet" roof ventilators and vent flue caps.

GENERAL ELECTRIC CO., AIR CONDITIONING DEPT., Bloomfield, N. J.—Booths 70-1.
In attendance: G. E. Simons, L. H. Hobson, A. Rubicam, H. W. Pennington, W. Mulcock, R. Stearns, J. G. Mooney, R. U. Berry, W. F. R. Karsten, H. Walker, R. C. Lindblom, A. N. Sarasohn, L. T. Brockbank, A. J. Carmody, R. Schaefer, M. N. Thrall, F. H. Faust.
Exhibiting: Full line of oil fired and gas fired heating equipment; air conditioning units; packaged coils and assemblies for both air conditioning and heating and ventilating systems; room units for multi-room building systems. Featuring oil fired warm air furnace and remote type room air conditioners.

GENERAL ELECTRIC CO., APPARATUS DIV., 1 River Rd., Schenectady 5, N. Y.—Booths 393-395.
In attendance: C. A. Falkenau, N. L. Parker, G. B. Henry, L. H. James, S. C. Smith, R. W. Kise, E. Rusch.
Exhibiting: New "G-E" electronic control system for commercial oil burners; electric heating devices; manual and magnetic starters and pushbuttons; single phase and polyphase integral motors; switchgear.

GENERAL ENGINEERING AND MFG. CO., 4417 Oleatha Ave., St. Louis 16, Mo.—Booths 263-264-266.
In attendance: Norman B. Schreiber, R. G. Brenner, J. Y. Hewitt, James Lamb, Al House, Charles J. Davis, Chester H. Fox, C. J. LeMaster, M. W. Nerius, Harry B. Osmundsen, F. H. Eldredge, Ernest Gygax, Pete Becker, John Schreiber, Arthur Huhn, Andy Love.
Exhibiting: "Gemco" 3 and 5 ton packaged air conditioning units, and featuring "Miracula" heat pump.

GENERAL FILTERS, INC., 12890 Westwood Ave., Detroit 23, Mich.—Booth 549.
In attendance: Mr. and Mrs. A. D. Redner, Robert G. Gregory, T. C. French, L. E. Schulein, V. B. Kathe, J. C. MacLachlan.
Exhibiting: Three models of fuel oil filters.

GENERAL FITTINGS CO., 123 Georgia Ave., Providence 5, R. I.—Booths 389-391.
In attendance: John J. Cotter, Robert F. Hull, Charles A. Maine, William G. Simms, H. F. Horton.
Exhibiting: Indirect heaters, tankless heaters, instantaneous heaters, converters, mixing valves, water hammer silencer, boiler units, coil heated tanks, tank heating units, live steam heaters, "Cady" automatic electric water heaters.

GENERAL MOTORS CORP.—See FRIGIDAIRE DIV.

GENERAL OIL HEATING CORP., 324 55th St., West New York, N. J.—Booth 322.
Exhibiting: "Genoco" oil burners and boiler burner units, featuring fuel mixing head.

GENERAL POWER PLANT CORP., 381 Fourth Ave., New York 16, N. Y.—Booth 481.

GOLD STAR OIL BURNER MFG. CO., INC., 146-150 Warburton Ave., Yonkers, N. Y.—Booths 678 & 679.
In attendance: Felix Sposito, Jr., Felix Sposito, Sr., Joseph Sposito, R. M. Sposito.
Exhibiting: Oil burners.

GREENLEE TOOL CO., 2136 12th St., Rockford, Ill.—Booths 535-536.
In attendance: Ray Samuelson, Adolph H. Hawkinson, George Walter Davis, A. L. Kirby, Ben Halliday, Don Fusaro, William Spear.
Exhibiting: Hydraulic benders for bending steel, copper pipe, and tubing for radiant heating; benders for electrical construction; hydraulic pipe pushers for pushing pipe underground, hand and power driven; knockout punches and knockout cutters; all kinds of tools for boring holes used either by hand or in electric or pneumatic boring machines; sheathing cutterheads for boring 2½ in. holes for rockwool installations; auger bits, car bits, chisels, gouges, draw knives for hand use. The pipe benders for radiant heating, the power driven pipe pushers, and the cutterheads for boring holes when insulating old homes, will be featured.

GRINNELL CO., INC., 260 W. Exchange St., Providence 1, R. I.—Booth 251.
In attendance: H. A. Keene, A. F. Van Eck, D. A. Johnson, various New York office sales representatives and engineers.
Exhibiting: "Thermolier" unit heaters, pipe fittings, pipe hangers, spring hangers, constant support hangers, valves, unions, welding fittings, flared fittings, automatic sprinklers, sway braces, prefabricated piping.

HANSON-GATES MFG. CO., 174 Lowell St., Reading, Mass.—Booth 514.
In attendance: Sherman R. Gates, George Redmond, Arthur Burkholder, Ralph Nash.
Exhibiting: "Powermatic" boiler-burner unit, complete line of oil fired domestic water heaters.

HARNER BOILER CO., 331 Sutter St., Brooklyn, N. Y.—Booth 461B.

HART & CROUSE CORP., P.O. Box 148, Oneida, N. Y.—Booth 500.

HEATING, PIPING & AIR CONDITIONING, 6 N. Michigan Ave., Chicago 2, Ill.—Booth 42.
In attendance: Frank P. Keeney, Chas. E. Price, C. M. Burnam, Jr., Wallace J. Osborn, Robert A. Jack, James D. Thomas, George C. Cutler.
Exhibiting: Publication, technical books, market data.

HEATING RESEARCH CORP., 16th & Locust—P. O. Box 391, Anderson, Ind.—Booths 330-332.
In attendance: Allan W. Lundstrum, H. W. (Tex) Milner, John H. Warden, Carl H. Dean.
Exhibiting: "Saf-Aire" gas heaters, featuring the "Lundstrum" vent; these heaters are direct fired convectors, recessed in outside walls, and they draw air for combustion and venting from outside and vent directly outside without using conventional draft diverter, vent, and flue.

HEATING & VENTILATING, 148 Lafayette St., New York 13, N. Y.—Booths 81-82.
Exhibiting: Publication.

HENRY FURNACE CO., Medina, Ohio.—Booths 282-284-291-293.

HERCO OIL BURNER CORP., 109 W. Chestnut St., Lancaster, Pa.—Booth 309.
In attendance: H. H. Wilkinson, Fred A. Wiker, Charles A. Lynch.
Exhibiting: Domestic fuel oil burners.

HERSHEY MACHINE & FOUNDRY CO., Manheim, Pa.—Booths 512-513.
In attendance: A. T. Bertolette, H. D. Merrill, J. F. Fisher, M. W. Acheson, G. E. Luders.
Exhibiting: "Motorstokors," boiler burner units, oil burners.

HOLCOMB & HOKE MFG. CO., INC., Indianapolis 7, Ind.—Booths 625-626.
In attendance: H. E. Blasingham, H. R. Blasingham, Bowman Downey, Frank Hoke.
Exhibiting: "Silent Breeze" ventilating fans (standard and "Gold Seal" lines); horizontal, mounted fan accessories, including suction box, automatic time switch and shutters. "HM" fan package, both fan and motor, lubricated for life, will be featured.

HOMEASE PRODUCTS DIV., BOGUE ELECTRIC CO., 52 Iowa Ave., Paterson 3, N. J.—Booths 317-319-321.
In attendance: A. R. Birkins, J. J. Carlson, E. R. Gould, E. P. Schinman, H. M. Miller, R. S. Herwig.
Exhibiting: Oil burners with automatic soot control equipment, featuring new large burner, new warm air furnace burner, moving picture in technicolor and sound showing manufacture of oil burner motor and transformer, and automatic soot control equipment.

HOMESTEAD EQUIPMENT & MFG. CORP., 125-01 Queens Blvd., Kew Gardens 15, N. Y.—Booth 665.

HOOK & ACKERMAN, INC., 18 E. 41st St., New York 17, N. Y.—Booths 7-15.

HOTSTREAM HEATER CO., 2363 E. 69th St., Cleveland 4, Ohio.—Booths 7-15.

HUNTER FAN & VENTILATING CO., 92 Warren St., New York, N. Y.—Booth 521.

ILLINOIS TESTING LABORATORIES, INC., 420 N. LaSalle St., Chicago 10, Ill.—Booths 545-546.
In attendance: W. J. Bailey, R. C. Chelius, J. A. Ariano, G. F. Bertrand, James A. Madden, M. J. Rauscher.
Exhibiting: "Velometers" (air velocity measuring instruments, resistance thermometers, surface temperature pyrometers, dew point indicators, wet and dry bulb thermometers).

INSTITUTIONS, 1900 Prairie Ave., Chicago 16, Ill.—Booths 28W & 28E.
Exhibiting: Publication.

IRON FIREMAN MFG. CO., 3170 W. 106th St., Cleveland 11, Ohio.—Booths 451-456.
In attendance: Gregory N. Laushkin, Howard B. Evans.
Exhibiting: Residential gas burners and furnaces; commercial-industrial "Coal-Flow" stoker; "Vortex" oil burner (domestic); high pressure gun type oil burner; residential anthracite stoker (spill-over type); residential anthracite stoker with automatic ash remover; residential oil furnace unit (with built-in "Vortex" oil burner); residential oil boiler with built-in "Vortex" oil burner; industrial oil burner. The industrial oil burner and a forced circulation gas furnace will be featured.

JACKSON & CHURCH CO., 321 N. Hamilton, Saginaw, Mich.—Booths 465, 466, 467.
In attendance: L. S. Redford, E. B. Root, C. J. Low, W. C. MacDougall, F. C. Adams, F. Hughes, S. Neide.
Exhibiting: "J&C Poweraire" winter air conditioning units for homes and small buildings, "J&C Powerated" winter air conditioning units for heating of large buildings, commercial, industrial, and processing. The display will contain features such as redesigned cabinets, larger heating surfaces, and complete service will be offered installers from the standpoint of acquainting them with large installations and how this business can be secured.

JEFFERSON ELECTRIC CO., Bellwood, Ill.—Booth 239.
In attendance: C. T. Harnett.
Exhibiting: Transformers.

JENKINS BROS., 80 White St., New York 13, N. Y.—Booths 85 & 86.
Exhibiting: Valves, composition discs, friction and rubber tapes.

JONES & BROWN, INC., 439 Sixth Ave., Pittsburgh 19, Pa.—Booth 636.
In attendance: G. C. Estes, C. J. Land, P. M. Hutchins, R. C. McDowell, George C. Kimball, William Doran, William Church, Carl M. Purcell, Harry Roeder.
Exhibiting: "Ko-Z-Aire" conditioning units (gas and oil fired), and featuring modulating multi-speed blower control.

JOY MFG. CO., 333 Oliver Bldg., Pittsburgh 22, Pa.—Booth 637.
In attendance: J. S. Morrow, Richard A. Heindel, Raymond Mancha, O. J. Neslage.
Exhibiting: Ventilating fans, and featuring new "Series 1000 Axivane" adjustable blade fans.

KAUFFMAN AIR CONDITIONING CO., 4505 Olive St., St. Louis, Mo.—Booths 547-548.
In attendance: Sam Kauffman, Angos Burns.
Exhibiting: Window and floor model room coolers, store coolers.

KAUSTINE CO. INC., Perry, N. Y.—Booth 205.
In attendance: Leon Kunicky, Russell Clark, John B. Mollnow, William Seitz.
Exhibiting: Winter forced air heating unit for oil burning equipment and the "Modulating Airflometer" which controls the flow of air according to the heat contained in the "hot" air stream.

KEENEY PUBLISHING CO., 6 N. Michigan Ave., Chicago 2, Ill.—Booth 42.
In attendance: Frank P. Keeney, Chas. E. Price, Wallace J. Osborn, Robert A. Jack, C. M. Burnam, Jr., James D. Thomas, George C. Cutler, John E. Peterson.
Exhibiting: American Artisan; Heating, Piping & Air Conditioning; technical books; market data.

KEHM CORP., 135 S. LaSalle St., Chicago 3, Ill.—Booths 376, 378, 380.
In attendance: J. H. Hilman, C. G. Newton, H. R. Coleman.
Exhibiting: Gas fired boiler; adjustable tee hot water heating system; coal, oil, and gas warm air furnaces. Miniature packaged furnaces and boilers for low cost homes will be featured.

KENDALL CO., BAUER & BLACK DIV., 2500 S. Dearborn St., Chicago 16, Ill.—Booth 640.

KENT CO., INC., 107 Canal St., Rome, N. Y.—Booth 573.
In attendance: C. E. Clifford, E. P. Wittschiebe, L. L. Steele, P. V. Hugues, G. W. Blanchard, G. C. Carley.
Exhibiting: Double suction furnace cleaner.

KEWANEE BOILER CORP., Kewanee, Ill.—Booths 304, 306, 308.
In attendance: John Hartman, Ben H. Schulze, H. W. McClure, E. J. Lambrecht, T. F. Maher, W. F. Sullivan, F. E. Bumphrey.
Exhibiting: "Scottie Jr." boiler, portable 9 hp unit built for 100 lb. steam, available sizes 6 to 30 hp, first exposition showing; type "C" welded boiler for low pressure steam heating, shown in section, sawed-in-two, 8500 sq ft size; "Bubbling" boiler in gas fired operation demonstrating generation of steam through illuminated observation ports.

KORFUND CO., INC., 48-15 Thirty-second Pl., Long Island City 1, N. Y.—Booth 618.
In attendance: S. Rosenzweig, Donald H. Vance, Robert L. Booth, J. Spachner, Bernard Ross.
Exhibiting: Spring, cork, and rubber isolation material for vibration and noise isolation of air conditioning equipment, featuring new type "RS" rubber-spring conical mounting and new twin-rail fan base, as well as working models demonstrating the efficiency of the exhibitor's isolation.

KOVEN & BROTHER, INC., L. O., 154 Ogden Ave., Jersey City 7, N. J.—Booths 36-37.

KRESNO-STAMM MFG. CO. (AMERICA) INC., 345 Commercial Ave., Palisades Park, N. J.—Booths 479 & 480.
In attendance: B. I. Stamm, A. Landow, A. W. Nugent, B. Landow, C. P. Scholz, C. S. Hoag, W. Dunlop, N. Fleisler.
Exhibiting: Oil heating equipment.

KRUEGER SENTRY GAUGE CO., INC., 1056 W. Mason St., Green Bay, Wis.—Booths 663-664.
In attendance: W. S. Krueger, M. J. Feifarek, J. F. Wilhelm, Irwin I. Platsky.
Exhibiting: "At-a-Glance" liquid level gages for fuel oil storage tanks; "Sentry Type M" barrel gages; special gages for stove and space heater industry; new draft regulators.

LANGTOT, INC., 32 E. Fourth St., New York 3, N. Y.—Booth 532.
In attendance: Horace R. Lange, Theodore J. Tottis, A. Fibel, Frank A. Waters.
Exhibiting: "Windo-Aire" ventilator.

LEWIS & COMPANY, INC., JOSEPH E., 1303 Carroll St., Baltimore 30, Md.—Booth 680.
In attendance: W. W. Saunders, J. R. McDonald, H. M. Spates, Alex Dawson, John Dawson, Geo. Derbyshire, W. H. Flickinger, J. C. Fullerton, Louis Mack, Frank Morillo, H. R. Oesterling, John Spencer, Joseph Tobin, Geo. Vedello.
Exhibiting: "Aqua" insulated tankless water heater, displayed for the first time in a national exposition; exhibit will show how it works, and how it will "benefit both those who install it and those who use it." Particular emphasis will be placed on the "turbu-flow" copper coil, the all welded steel shell, and the preformed asbestos insulating jacket.

LIBBEY-OWENS-FORD GLASS CO., Nicholas Bldg., Toledo 3, Ohio—Booth 462.

LIEBLICH BURNER SERVICE, INC., 36 W. 66th St., New York 23, N. Y.—Booths 524-525.

LINDE AIR PRODUCTS CO., 30 E. 42nd St., New York 17, N. Y.—Booths 530-531.

LINDY HEATERS, INC., 2370 Hoffman St., New York 57, N. Y.—Booth 611.
In attendance: Otto Lindy, Lawton R. Moray, Sandy Silberstein, Bill Opper, Henry Wieland.
Exhibiting: Indirect water heaters, heat exchangers, flexible union connectors.

LOCKFORMER CO., 4615 W. Arthington St., Chicago 44, Ill.—Booth 614.
In attendance: George W. Lamberson, Richard B. Caswell, John Davis.
Exhibiting: Nos. 24 and 20 "Lockformers"; "Easy Edger."

LONERGAN MFG. CO., Albion, Mich.—Booth 621.
In attendance: J. L. Stephens, S. J. Lonergan, Jr.
Exhibiting: Winter air conditioners.

LORAIN DIV.—see AMERICAN STOVE CO.

LUNDT INC., ERNEST C., 74 Grove St., Montclair, N. J.—Booths 7-15.

McDONNELL & MILLER, INC., Wrigley Bldg., Chicago 11, Ill.—Booth 62.

MILWAUKEE GAS SPECIALTY CO., 730 N. Jackson St., Milwaukee 1, Wis.——Booths 7-15.

MODINE MFG. CO., 1500 DeKoven Ave., Racine, Wis.—Booths 381-3-5.
In attendance: Owen Desmond, M. J. Druse, A. G. Dixon, C. T. Perkins, B. Spieth, W. R. McMahon, Harry Clark, Theo. Walters, John Soule.
Exhibiting: Unit heaters, convector radiation, and heating coils, and introducing a complete new line of heating coils for steam and hot water.

MONARCH MFG. WORKS, INC., 2501 E. Ontario St., Philadelphia 34, Pa.—Booth 354.
In attendance: J. M. Carroll, E. B. Frame, T. W. Murphy.
Exhibiting: Spray nozzles, strainers, regulating valves.

MOORE CO., 544 Westport Rd., Kansas City 2, Mo.—Booth 289.
In attendance: Robert D. Moore, Whitney M. Kerr.
Exhibiting: Vaneaxial ventilating fans and pressure blowers, featuring direct drive fans and blowers to 8 ft diameter.

MORRISON STEEL PRODUCTS, INC., Buffalo, N. Y.—Booths 7-15.

MORSE-SMITH-MORSE, INC., 165 Dexter Ave., Watertown 72, Mass.—Booth 272.
In attendance: John C. Dieselman, William E. Macneil.
Exhibiting: Fusible valves, globe valves, ball check valves, anti-hum - anti-syphoning valves, thermal switches, oil filters, tank gages, vent caps, etc. Featuring a small, permanent filter with replaceable cartridge.

MORTON ASSOCIATES, INC., HENRY J., 20532 W. Eight Mile Rd., Detroit 19, Mich.—Booth 631.

MOTOR WHEEL CORP.—see DUO-THERM DIV.

MUELLER FURNACE CO., L. J., 2005 W. Oklahoma Ave., Milwaukee 7, Wis.—Booths 316-318-320, and in AGA space.
In attendance: H. P. Mueller, C. L. Hewitt, Jr., F. J. Nunlist, J. S. Rosebrough, E. H. Saunders, Otto Ress.
Exhibiting: Gas fired, oil fired and coal fired air conditioning units, gravity furnaces, gas boilers, gas conversion burner, oil conversion burner, cooling unit, and featuring new oil fired and gas fired units.

MULTI-VENT DIV.—see PYLE-NATIONAL CO.

MUNN AND STEELE, INC., 130 Lister Ave., Newark, N. J.—Booths 669-670.
In attendance: H. W. Hoeft, William S. Steele, Thomas Jewkes, Fred Fowler.
Exhibiting: Combustion chambers, refractories, baffles, high temperature coatings, bonding cement, "Backafil," ramming and castable cements, and accessory products. Custom made and standard types of incandescent high temperature refractory products based on "Palabora" vermiculite will be featured.

MYSTIK ADHESIVE PRODUCTS, 2635 N. Kildare Ave., Chicago 39, Ill.—Booth 651.
In attendance: C. J. Cragin, G. H. Faulkner.
Exhibiting: "Self-Stik Dri-Pipe;" adhesive tape (industrial, retail). Featuring industrial "Dri-Pipe."

NATIONAL AIR CONDITIONING INC., 221 Central Ave., Johnstown, Pa.—Booth 218.
In attendance: William A. Schlesinger, Joseph Zidalis.
Exhibiting: "Teg" conditioner—first showing at a heating and ventilating exposition of a working display of this product by the manufacturer.

NATIONAL HOME EQUIPMENT CO., 50 Church St., New York 7, N. Y.—Booth 461-A.
In attendance: John Kautzmann, Charles P. Balsam.
Exhibiting: Kitchen exhaust blowers, evaporative coolers, suspended gas fired unit heaters, automatic oil fired storage water heaters, winter air conditioning units (oil and gas fired).

NATIONAL OIL BURNER CO. OF N. Y., INC., 614 Bergen St., Brooklyn 17, N. Y.—Booths 274-276.
In attendance: Perry Wolfe, Nat Kaufman, Joseph Esquirol.
Exhibiting: Horizontal rotary, industrial fuel oil burner.

NATIONAL RADIATOR CO., 221 Central Ave,. Johnstown, Pa.—Booths 248-250-252-254.
In attendance: Paul B. Holmes, J. W. Hall, K. O. Schlentner, H. W. Williams, R. A. Schmicker, F. W. Eichler, G. A. Baerenklau, L. R. Snelling, H. F. White, P. J. Thompson.
Exhibiting: 18 in. residential steel oil heating unit, 26 in. residential steel boiler, number "20" series gas boiler, "100" and "200" series "Heat Extractor" (cast iron), "Art" radiators, "Aero" convectors, unit heater, fin tube convector.

NATIONAL TUBE CO., Pittsburgh 30, Pa.—Booths 311-313.

NEWARK TRANSFORMER CO., Park & Linden Aves., Linden, N. J.—Booth 612.
In attendance: Norman A. Lunenfeld, Maximilian Chameides, Robert Natol.
Exhibiting: Oil burner ignition transformers, 110 and 220 primary, 5000 10,000, 12,000 and 15,000 secondary voltage, 50 and 60 cycle; featuring new round, simplified design and construction model "offering advantages of easy assembly and reduced procurement cost," and new compact unit "resulting in 25 percent reduction in standard size of ignition transformer.

NEW YORK OIL HEATING ASSOCIATION, INC., 42-26 28th St., Long Island City 1, N. Y.—Booth 539.

NEW YORKER STEEL BOILER CO., INC., SUCCESSORS TO TITUSVILLE SALES CO., 50 W. 50th St., New York 20, N. Y.—Booth 94.
In attendance: Edward J. Heckler, Lester K. Hillman.
Exhibiting: Steel house heating boilers. Several accessories which will help in the saving of time by service men will be featured.

NIAGARA BLOWER CO., 405 Lexington Ave., New York 17, N. Y.—Booths 23, 24, 25.
In attendance: Paul H. Schoepflin, W. L. Offenhamer, D. L. King, O. F. Gilliam, M. F. Lowe.
Exhibiting: "No Frost" refrigeration system, "Aero" heat exchanger, "Aero-Pass" condenser, high pressure fan heater. liquid cooler, featuring new designs for the condenser and the "No Frost" system.

NIAGARA FURNACE DIV., FOREST CITY FOUNDRIES CO., 2500 W. 27th St., Cleveland 13, Ohio—Booths 516 & 517.
In attendance: William A. Fitzsimons, Robert H. Leisenheimer, Thornton S. House, Irving E. Seith, Willis G. Harkness.
Exhibiting: Gas, oil, and coal fired furnaces and air conditioning units.

NORGE HEAT DIV., 672 E. Woodbridge St., Detroit 26, Mich.—Booths 556 & 557.
In attendance: H. C. Altenburg, J. C. Cooper, H. W. Ford, A. Michie, G. M. Johnston, J. M. McNamara, W. C. Walter, C. A. Randolph, C. S. Davis, Jr., J. W. Oswald, G. R. Neumann, K. F. Russell, Fred Bishop, Jr., Loel Otten, M. A. Straub.
Exhibiting: Winter air conditioning units (oil burning); oil burning furnaces; oil burning floor furnaces; oil burning water heaters. Featuring oil conversion burner.

NORMAN PRODUCTS CO., 1150 Chesapeake, Columbus 12, Ohio.—Booths 405-408.
In attendance: E. A. Norman, Jr., D. D. Piper, Ray Monsell, Paul Sagar.
Exhibiting: Gas furnaces, gas conversion burners, and oil burners, and featuring new 60,000 Btu input central heating gas furnaces that can be installed under floor, in attic, or in a closet; also new gas-oil "surprise."

OIL EQUIPMENT MFG. CORP., 75 Brewster St., New Haven, Conn.—Booth 574.
In attendance: Arnold J. Alderman, Daniel Kaufman, Irving Marinoff.
Exhibiting: "King" tank gage, complete line of fuel oil and gasoline storage tank fittings. A new and unique piece of testing apparatus which the exhibitor believes will be "as popular and acceptable to the oil burner dealer and service man as the oil burner itself" will be introduced.

OLSEN MFG. CO., C. A., Elyria, Ohio.—Booths 282, 284, 291, 293.
In attendance: C. A. Olsen, Edward P. Hayes, C. L. Grandstaff, J. P. Cullin, W. H. Olsen, E. J. Marre, Jr.
Exhibiting: Warm air furnaces and air conditioning units for coal and gas; furnace pipe, fittings, and prefabricated ducts; "Mayn" air dampers. Cast iron, gas fired air conditioning unit; steel, coal air conditioning unit, readily convertible to oil or gas firing, will be featured.

OWENS-CORNING FIBERGLAS CORP., Toledo 1, Ohio.—Booths 416-417-418.

PACIFIC MFG. CORP., 5308 Blanche Ave., S.E., Cleveland 4, Ohio.—Booths 552-553.
In attendance: H. C. Troth, Stephen C. May, J. H. Merritt, Jr.
Exhibiting: Portable room type air conditioners, featuring two new models that include many improvements in sound elimination, serviceability, and simplicity of manufacture.

PACIFIC STEEL BOILER DIV. — see UNITED STATES RADIATOR CORP.

PACKAR MFG. CO., 8 W. 40th St., New York 18, N. Y.—Booth 281.
In attendance: Joseph Packar, Alfred W. Funabashi.
Exhibiting: Fuel storage tanks, oil burners, oil burner component parts.

PALMER MFG. CORP., 2200 W. Fillmore St., Phoenix, Ariz.—Booth 461-A.
Exhibiting: 80,000 Btu "Palmaire" suspended unit heater (gas fired), 1800 cfm blower model "Snow-Breeze" evaporative cooler (window type), both of which are new 1948 models ""in advanced design" for which this will be the first showing.

PARAGON ELECTRIC CO., 1600 12th St., Two Rivers, Wis.—Booth 315.
In attendance: Norman Becker, Harold Paley, George Cane, Read Eldred.
Exhibiting: Automatic time switches, featuring 7-day calendar dial time switches providing for holiday and Sunday cutout.

PARKE-HILL CHEMICAL CORP., 57 S. 6th Ave., Mt. Vernon, N. Y.—Booth 470.

PENNSYLVANIA FURNACE & IRON CO., Warren, Pa.—Booths 7-15.

PETERS DALTON, INC., 17900 Ryan Rd., Detroit 12, Mich.—Booths 443-444-445.

PETROMETER CORP., 1 Star Sq., Long Island City 1, N. Y.—Booth 41.
In attendance: Dan Bierman, Arthur Bierman, Mrs. Anna M. Kohl, Norbert M. Milair, Russ Dempsey, George H. Altemose, Joseph A. Jawett, Miss Janina Choinski, William Maas, Harold Marquart.
Exhibiting: Liquid depth indicators.

PEZZILLO PUMP CO., INC., 1343-47 W. Cumberland St., Philadelphia 32, Pa.—Booth 615.
In attendance: A. R. Pezzillo, F. J. Coonan, A. H. Pezzillo, Adrian Bauer, Harvey Finestone, Donald Lane, D. P. Litzenberg, Howard White, Nat C. Rosenfeld, Bert Kaatz, Richard Barthelmess, W. H. Flickinger, F. Morello, Wm. McAdams, Joseph Sweeney, David Savitzky, J. E. Fowler, Jr., J. Vernon Haverton, Harry Karp, E. C. Shaw, D. Daulton, Charles Fuchs, David Benn, M. M. Johnston, J. Harland McBroom, John S. Lewis, Harry P. Young, LeRoy G. Lininger, Jim Mianulli, I. Goldberg, J. N. Goldberg.
Exhibiting: Water circulator, and featuring combined motor pump.

PILGRIM OIL BURNER CO., P. O. Box 812, Hartford, Conn.—Booth 447.

PIQUA MACHINE & MFG. CO., Young & College Sts., Piqua, Ohio—Booth 616.
In attendance: R. D. Speigle, E. S. Slaughter, B. I. Avey.
Exhibiting: Fractional horsepower motors, featuring "Vibratrol" motor.

PITTSBURGH CORNING CORP., 632 Duquesne Way, Pittsburgh 22, Pa.—Booth 235.
In attendance: Vic Sanders, R. A. Biggs, Paul D. Japp, Robert F. Quinn.
Exhibiting: "PC" glass blocks for residential, commercial, public, and industrial buildings; "PC Foamglas" insulation for roofs, walls, floors, and process equipment.

PITTSBURGH EQUITABLE METER DIV., ROCKWELL MFG. CO., 400 N. Lexington Ave., Pittsburgh 8, Pa.—Booth 671.
In attendance: M. J. Harper, W. R. McLaughlin, D. L. Jerman, M. R. Fuggette.
Exhibiting: "Rockwell-Emco" appliance regulators (bodies and covers pressure cast from a special aluminum alloy), "Crawford" regulators, flow indicating meters.

PLIBRICO JOINTLESS FIREBRICK CO., 1800 Kingsbury St., Chicago 14, Ill.—Booth 35.

PLUMBING & HEATING JOURNAL, 45 W. 45th St., New York 19, N. Y.—Booth 505.
Exhibiting: Publication.

PREFERRED UTILITIES MFG. CORP., 1860 Broadway, New York 23, N. Y.—Booths 60-61.
In attendance: R. S. Bohn, G. W. Bohn, J. S. Kaplan, M. Sherman, C. R. Schneider, B. K. Breed, F. S. Sale, G. W. Copp.
Exhibiting: Unit steam generators, horizontal rotary oil burners for commercial and industrial use, pressure atomizing oil burners for domestic use, "Draft-A-Justors."

PYLE-NATIONAL CO.—MULTI-VENT DIV., 1367 W. 37th St., Chicago 9, Ill.—Booth 283.
In attendance: George K. Raider, Walter M. Nesteruk, Herbert K. Kunen, Robert Kunen, R. G. McLaughlin.
Exhibiting: "Multi-Vent" panels for uniform, draftless air distribution.

QUAKER MFG. CO., 223 W. Erie St., Chicago 10, Ill.—Booths 300 & 302.
In attendance: A. T. Atwill, O. J. Long, C. B. Nelson.

Exhibiting: Pot type space heaters; air conditioning furnaces, vaporizing-type conversion burners. Featuring the "3210", a vaporizing, pot type heater with "Quakertrol," an ingenious device which synchronizes the flow of oil and air "to such an extent that the heater can operate entirely independent of a chimney." It also has an automatically controlled air circulator "which gently circulates the warm air."

QUIET HEET MFG. CORP., 135 N.J.R.R. Ave., Newark 5, N. J.—Booth 654.
In attendance: Samuel L. Peters, Robert L. Peters, Seymour L. Sloan, Michael Kleigman.
Exhibiting: Oil burners (three models).

RADIANT UTILITIES CORP., 1853 Cropsey Ave., Brooklyn 14, N. Y.—Booth 606.
In attendance: Jacob G. Goldberg, Andrew J. Gregg, Arthur A. Marcus, Julius S. Goldberg, Joseph Bloom.
Exhibiting: Automatic oil burner.

RANDALL GRAPHITE BEARINGS, INC., 609 W. Lake St., Chicago 6, Ill.—Booths 537 & 538.
In attendance: M. E. Clark, E. A. Lampe.
Exhibiting: Pillow blocks and graphited bronze bushings, featuring new bracket type bearings and new streamlined bearings.

RAY OIL BURNER CO., 401-499 Bernal Ave., San Francisco, Calif.—Booths 214-216.
In attendance: F. X. Fitzpatrick, H. E. Boos.
Exhibiting: Representative models of a complete line of horizontal rotary oil burners, featuring fully automatic heavy oil burning and combination gas-oil burning units; representative types of burners using direct, belt and steam turbine drives, required to meet varied field requirements; pressure burner for both straight oil and combination gas-oil applications; display of complete line of oil and combination gas-oil burner equipment in capacities 1 to 1000 boiler horsepower.

RAYTHEON MFG. CO., Waltham 54, Mass.—Booths 435-436.

REDMOND CO. INC., Owosso, Mich.—Booths 485-486.
In attendance: James Tweedy, R. T. Abrell, Glenn Baumhardt, W. R. Fox, J. J. Griffin.
Exhibiting: Low-range "Micromotor" fractional horsepower motors in sizes up to 1/15th hp, in drawn steel cases and die cast cases, in totally enclosed models and ventilated models; blower units with capacities up to 100 cfm; speed controllers. New lines of four pole motors in sizes up to 1/15th hp, new line of six pole motors in sizes up to 1/15th hp, and new type of blower unit will be featured.

REFRACTORY & INSULATION CORP., 120 Wall St., New York 5, N. Y.—Booth 310.
In attendance: J. A. Bliss, J. J. Bliss, G. A. Mann, E. A. Weber, H. L. Marwick, F. Christenson, H. N. Clark, R. T. Hegeman.
Exhibiting: "R&I" combustion chamber, hearth cement, "Moldit" chrome, "Stic-Tite," "Insul-Fil," black furnace cement. The deluxe chamber with reversible base will be featured—grooves on both sides of base into which side sections fit easily and quickly makes it simple to form chambers of various size for jobs burning 1.00 to 2.50 gph.

REIF-REXOIL, INC., 37-43 Carroll St., Buffalo 3, N. Y.—Booths 423 & 424.
In attendance: Allan F. Reif, Charles A. Reif.
Exhibiting: Domestic, commercial, and industrial pressure atomizing oil burners in four models covering a capacity range of 0.7 to 30 gph; horizontal rotary type oil burners for heavy oil in seven sizes covering a capacity range of from 15 to 165 gph; domestic boiler burner unit; direct fired winter conditioning unit. The domestic pressure atomizing burners will display the patented "High-heat" combustion head, air stream turbulation, quick cut-off fuel "Hoarder" and "Monotrol" air adjustment; the boiler unit is of new design being an all welded steel boiler of high tensile corrosion resisting plate and incorporating "speed steaming features" which it is expected will be demonstrated; a new conditioning unit of simplified design and great primary and secondary heating surfaces will be shown.

RESEARCH PRODUCTS CORP., 1015 E. Washington Ave., Madison 3, Wis.—Booth 603.
In attendance: M. H. Kliefoth, John G. Schutz, John A. Strom, George W. Summers, A. W. Brown.
Exhibiting: "Self-Seal" replacement filters, "Alumaloy" washable air filters and grease filters, filter holding frames, filter "Watchman."

REYNOLDS METALS CO., 2500 S. Third St., Louisville 1, Ky.—Booths 554-555.
In attendance: Hal Logsdon, Stuart Smith, J. W. Chapman, R. J. Gibbons, Ben Downs, Bob Stuart, John O'Keefe, John Blomquist, R. E. Scott, R. J. Snyder, A. W. Hess, H. G. Fieger, C. A. Bay, Robin Garr, A. M. Moyer, R. E. Spitz, R. H. Ewing, Jr.
Exhibiting: Aluminum for duct work, and various other products used in heating and ventilating and made of aluminum.

RHEEM MFG. CO., 570 Lexington Ave., New York 22, N. Y.—Booths 64-65-68-69.

RICHFIELD MFG. CO., 315 Fifth Ave., New York 16, N. Y.—Booth 610.
In attendance: George Bernhard, John C. Stafford, Jerome Ganz.
Exhibiting: Flame control oil burner, flame control turbulator head. The turbulator head, by means of a unique and unusual control arrangement, accurately regulates the turbulence of the primary air, and in addition, meters through a special torpedo tube a quantity of secondary air that washes directly over the nozzle. This enables the burner to handle "even the new hotter catalytic oils without smoking, and an exceptionally high CO_2 is obtainable."

RICHMOND RADIATOR CO., 19 E. 47th St., New York 17, N. Y.—Booths 52-53.
In attendance: W. H. Armstrong, R. C. Champlin, S. D. Mizell, D. M. Ramsay, E. C. Riley, Norman Rowen, H. H. Williams, John J. Hall, C. W. Farrar, Michael L. Lavorgna, R. O. Pallin.
Exhibiting: Winter air conditioners, boilers, and radiators, featuring two new lines of winter air conditioners and a new line of boilers.

RIDGE TOOL CO., Elyria, Ohio—Booths 622-623-624.

ROBERTS-GORDON APPLIANCE CORP., 137 Arthur St., Buffalo 7, N. Y.—Booths 257, 259, 261.
In attendance: W. S. Gordon, Jr., L. C. Smyth, J. C. Bowery, S. R. McCarthy, C. C. Nordensson, R. T. Huyck, S. C. Bratton, J. G. Cameron, E. H. Durning, J. H. Fagan, J. C. Fullerton, W. J. Gillette, J. C. Fullerton, W. A. Hammond, Porter Hurd, R. E. Landers, Gene McDonald, Brooks Morris, W. L. Peterson, J. S. Ridge, R. S. Roberts, R. C. W. Olson, F. J. Scull, H. H. Skinner, R. G. Wallace, V. E. Napier, H. L. Siebenthaler, H. G. Carter.
Exhibiting: Domestic conversion gas burners, industrial and commercial gas burners, and featuring forced warm air furnaces, gravity furnaces, boilers, and unit heaters.

ROBERTSON CO., H. H., 2400 Farmers Bank Bldg., Pittsburgh 22, Pa.—Booths 672-673.
In attendance: J. J. Siddall, Clyde M. Read.
Exhibiting: Ventilators, protected metal roofing and siding, light gage steel flooring and siding.

ROCKWELL MFG. CO.—see PITTSBURGH EQUITABLE METER DIV.

ROME-TURNEY RADIATOR CO., Canal St., Rome, N. Y.—Booth 499.
In attendance: William L. Lynch, Edwin J. Parry, E. L. A. Forster, Joseph M. Shannon.
Exhibiting: "RoCop" convector radiators.

RUSSELL CO., F. C., 6400 Herman Ave., Cleveland 2, Ohio—Booth 429.

SAMPSEL TIME CONTROL, INC., 600 N. Strong Ave., Spring Valley, Ill.—Booth 419.
In attendance: L. E. Schulein, A. L. Novotny, Wayne M. Davis, James D. Singelyn, H. M. Sawrie, Jr., Dick Halberg, Jeff A. Hedden, F. M. Eversden, P. Erickson, Gene Moran, F. Singelyn, H. Krogman, Earl L. Miller, T. C. French, Roger Vinson, Henri Duizend, C. E. Owen, Ben H. Williams, H. W. Winningham, H. F. Smith, C. R. Bredeson, S. C. French, M. G. Rentfrow.
Exhibiting: General heating control line for coal, gas, and oil, and featuring several products under development which will be displayed for the first time.

SANGAMO ELECTRIC CO., Springfield, Ill.—Booth 667.
In attendance: C. R. Burt, C. R. Dobson, Duane Arbuthnot.
Exhibiting: Time switches, featuring an entirely new low priced time switch designed particularly for home installation and furnished in ivory or brown bakelite.

SARCO CO., INC., Empire State Bldg., New York 1, N. Y.—Booth 80.
In attendance: E. J. Ritchie, R. W. Cumming, E. M. Donahue, P. Girardet, J. Thompson, F. M. Semple, R. E. Bolaffio, J. J. Flanagan.
Exhibiting: Complete line of heating specialties for steam and hot water heating and control. Featuring a new weather control for steam heating systems directly proportioning steam supply to the building from outside temperature to provide continuous modulated heat; new line of air eliminators for vapor and vacuum systems: "Sarcotherm" system of automatic weather control of radiant heating and forced hot water systems directly by outside temperature.

SCHNACKE, INC., 1016 E. Columbia St., Evansville 7, Ind.—Booth 566.
In attendance: F. C. Schnacke, E. J. Miller, T. G. Thomas, W. H. Hollingsworth, Basil S. Miller, Parke Syers, G. A. Lamb.
Exhibiting: 5 hp, 25 hp, and 50 hp condensing units, and displaying the refrigerant cooled cylinder sleeve incorporated in these units.

SCHWITZER-CUMMINS CO., 1145 E. 22nd St., Indianapolis, Ind.—Booths 459-460-461.
In attendance: Louis Schwitzer, Sr., Louis Schwitzer, Jr., Fred S. Robinson, George J. Ley, George A. Schnieders, H. L. McCormick.
Exhibiting: 12, 16, and 20 in. exhaust, portable, and window fans; 24 in. combination window and attic fan; "Fresh-Air Maker" attic ventilator; "Hy-Duty" blowers; blower wheels, featuring entirely galvanized wheels and of especial interest to manufacturers of evaporative coolers and special heating and air conditioning products.

SCOTT-NEWCOMB, INC., 1442 S. Boyle Ave., St. Louis 10, Mo.—Booths 350 & 352.
In attendance: Lewis L. Scott, J. T. Scott, D. J. Scott, C. E. Atkinson.
Exhibiting: 1-5 gph, 6-12 gph, and 10-20 gph oil burners; gas, oil and coal warm air furnaces; oil and electric water heaters; water softeners; ventilating fans; portable and attic night cooling fans; oil and gas boilers; garbage grinders. Exhibit will feature cooling equipment and housing program.

SCULLY SIGNAL CO., 88 First St., Cambridge 41, Mass.—Booths 676 & 677.
In attendance: Frank P. Scully, Carl Goddard, George Schutter, Robert Young.
Exhibiting: "Ventalarm" signal for safeguarding tank filling, and making the oil burner "completely automatic even to the fuel delivery;" "Fil-Gard," an automotive accessory for safeguarding automobile gasoline tanks against overflow and spillage.

SELECTROL ENGINEERING CO., 2036 McDonald Ave., Brooklyn 23, N. Y.—Booth 668.
In attendance: Louis Galum Beck, Nat Baranoff, Walter Ulrich.
Exhibiting: Gun type domestic burner, downdraft steel boiler, BX connectors, fill boxes, vent caps.

SERVEL, INC., Evansville 20, Ind.—Booths 564-565.

SHAFCO DISTRIBUTING CORP., 1354 Book Bldg., Detroit 26, Mich.—Booths 674 & 675.
In attendance: T. E. Trese, Howard C. Sawyer, Ray H. Monsell, Kenneth J. Hilsenbeck.
Exhibiting: Suspended oil fired unit heater.

SHEET METAL WORKER, 45 W. 45th St., New York 19, N. Y.—Booth 505.
Exhibiting: Publication.

SKUTTLE MFG. CO., 4099 Beaufait Ave., Detroit 7, Mich.—Booth 464.

SMITH CO., INC., H. B., 57 Main St., Westfield, Mass.—Booths 628 & 629.
In attendance: W. M. Todd, R. W. Conway, R. F. L. Mattlage, Leo Sudhaus, J. M. Cavanaugh, J. E. Reed.
Exhibiting: Boilers for homes, commercial, public, and industrial buildings.

SMITH MFG. CO., INC., F. A., P. O. Box 509, Rochester 2, N. Y.—Booths 491-492.
In attendance: H. M. Sylvester, D. R. Schroedel, W. T. Jensen, C. A. Button.
Exhibiting: "Fasco" shaded pole motors, 1/8 to 1/500 hp; blowers, 15 to 140 cfm; wall ventilators; exhaust fans.

SMITH TWIN TUBULAR BOILER CO., INC., State Road & Cottman St., Philadelphia 35, Pa.—Booth 496.
In attendance: W. F. Callahan, G. W. Hickey, C. E. Woolston, H. G. Smith.
Exhibiting: Residential and commercial low pressure heating boilers.

SNIPS, 5707 W. Lake St., Chicago 44, Ill.—Booth 662A.
Exhibiting: Publication:

SONNERS BURNER CO., 412 E. 6th St., Winfield, Kans.—Booths 7-15.

S.O.S. PRODUCTS CO., INC., 282 Nassau Ave., Brooklyn 31, N. Y.—Booths 443-444.
In attendance: I. S. Pryor, G. G. French, L. J. Goldstein, A. F. Nertney, S. S. Schwartz.
Exhibiting: Chemical and refractory products, featuring interlocking combustion chamber.

SPENCE ENGINEERING CO. INC., Walden, N. Y.—Booths 533 & 534.
In attendance: Paulsen Spence, H. W. Angelery, J. L. Bruns, F. Christ, J. Stasick.
Exhibiting: Pressure regulators, temperature regulators.

SPENCER HEATER DIV., AVCO MFG. CORP., 164 Park St., Williamsport 19, Pa.—Booth 255.
In attendance: D. A. Reinhardsen, D. J. Falk, E. V. O'Brien, C. K. Dennis, E. A. MacDonald, J. C. Ickeringill, H. A. Johnson, R. S. Brenan, C. W. Shaffer, R. R. Adams, Larue Mahl.
Exhibiting: Residential steel and cast iron boilers, oil fired boiler-burner unit, featuring all-purpose cast iron flat crate boiler, new series "F" magazine feed boiler, and the boiler-burner unit.

SPROUSE CO., INC., V. E., Columbus, Ind.—Booth 627.
In attendance: Harry E. Blasingham, Harry R. Blasingham, Bowman Downey, Robert Stang, George Jerman.
Exhibiting: "Deluxe" kitchen ventilator, 10 in. window ventilator, 24 in. window fan.

STAINLESS & STEEL PRODUCTS CO.—see CERTIFIED FURNACE CO. DIV.

STANDARD HEATER & OIL EQUIPMENT CO., 245 Cornelison Ave., Jersey City 2, N. J.—Booths 601 & 602.
In attendance: Nathan Cooper, George Cooper, Harold Garfinkel, Harry G. Gamble.
Exhibiting: Heating boilers and heat exchangers, featuring new heating boiler.

STANDARD-YNE SERVICE, INC., 332-336 Grand Ave., Brooklyn 5, N. Y.—Booths 646 & 647.
In attendance: Leonard Hersh, Elias Levine, Jerome S. Moshman, Andrew McGowan, David Markson, B. Vincent Roth.
Exhibiting: Fuel oil burners, oil fired boiler-burner units, gas fired boiler-burner units.

STEDCO PRODUCTS, Kingston, Pa.—Booth 448.

STEEL PRODUCTS ENGINEERING CO., Springfield, Ohio—Booths 489-490.

STEEL PRODUCTS, INC., 105 Water St., West Haven, Conn.—Booth 604.
In attendance: Irvin A. Shiner, Alexis S. Gorshkoff.
Exhibiting: Domestic oil burner.

STEWART MFG. CO., INC., 610 Bloomfield Ave., Bloomfield, N. J.—Booth 643.
Exhibiting: High velocity outlets; grilles; registers.

STOKOL STOKER CO., INC., 2060 Northwestern Ave., Indianapolis 7, Ind.—Booth 635.
In attendance: John F. O'Donnell, Jack Ahearn, Harry P. Young, A. H. Gardner.
Exhibiting: Domestic stokers, oil fired winter air conditioners, gas fired winter air conditioners, oil fired water heaters, oil fired conversion burners, oil fired boilers.

SUPER ELECTRIC PRODUCTS CORP., 1057 Summit Ave., Jersey City, N. J.—Booth 620.

SURFACE COMBUSTION CORP., 2375 Dorr, Toledo 1, Ohio—Booths 50-51, 54-55.
In attendance: W. A. Adams, R. A. Caylor, C. B. Charmatz, H. T. Gates, H. A. Gross, H. C. Gurney, H. E. Hicks, K. G. Hull, R. M. Johnke, T. J. Langan, C. H. Langendorf, F. J. Lilly, G. P. Mandel, L. J. Monaham, L. B. McCoy, H. J. McKay, R. R. Ramsay, R. B. Thornburgh, F. H. Adams, C. B. Phillips, E. A. Weaver, W. J. Grover, R. B. Hitchcock, R. E. Hollinshead.
Exhibiting: Winter air conditioners, "triple service" hot water system, unit heaters, "Janitrol" boiler, conversion burners, "Therm-O-Attic" unit, gravity furnace. Featuring "Triple Service" hot water system, new gravity furnace, scale models of typical warm air and hot water radiant panel heating installations, scale model of Columbus factory and engineering laboratory.

SWIFT LUBRICATOR CO., Elmira, N. Y.—Booth 445.

SYNCROMATIC CORP., 1141 10th St., Watertown, Wis.—Booths 342 & 344.
In attendance: R. C. Jaye, H. M. Stillman, O. W. Kobin, J. S. Sullivan, W. O. Skold.
Exhibiting: Steel coal fired warm air furnace, gravity or forced air; steel oil fired warm air furnace, forced air, gun type burner; steel gas fired warm air furnace, forced air, gun type oil burner. "Hi-Boy" steel oil fired unit for gun type or "Breeze" burner will be featured.

TACO HEATERS INC., 137 South St., Providence 3, R. I.—Booths 83 and 84.
In attendance: R. T. Angevine, J. Balter, R. H. Chaffee, R. S. Doherty, R. P. Gaulin, E. T. Houlihan, J. R. Murphy, R. T. Schoerner, W. J. Sliney.
Exhibiting: Tankless water heaters, storage water heaters, circulators, relief valves and reducing valves, venturi fittings, flow checks, "Taco-Matic" valve, "Flo-Jet," tempering valves. In addition, a new product for use with panel heating systems will be exhibited for the first time.

TAL BENDER, INC., 417 N. Water St., Milwaukee 2, Wis.—Booth 468.
In attendance: E. T. Tal, Mrs. C. L. Tal.
Exhibiting: Pipe and tube bending equipment, featuring special equipment for installing radiant panel heating.

TAYLOR FORGE & PIPE WORKS, P. O. Box 485, Chicago 90, Ill.—Booths 312-314.
In attendance: F. S. G. Williams, W. E. G. Lucas, J. Ford Pollock, Jr., J. Berry McOwen, Michael Delohery, James A. Greer, S. L. Barber, C. C. Krushel.
Exhibiting: Welding fittings, forged steel flanges.

TELECHRON, INC., Homer Ave., Ashland, Mass.—Booth 613.
In attendance: A. H. Rippas, D. S. Mayo, C. B. Dix.
Exhibiting: Synchronous timing motors and instrument movements, signal timers, switch timers, combination clock and signal timers, combination clock and switch timers, advertising clocks.

TENNESSEE COAL, IRON & RAILROAD CO., Birmingham, Ala.—Booths 311-313.

THATCHER FURNACE CO., Center St., Garwood, N. J.—Booths 26 & 27.
In attendance: Russell M. Cook, M. C. Beard, P. Fleury, R. C. Chambers, J. Lyon, D. J. Buckley, C. J. Johnson, J. Sheehan, R. Eyers, J. Keefe, J. Price, T. J. Gallagher.
Exhibiting: Gas fired "Comfortmaster" winter air conditioner, oil fired "Comfortmaster" winter air conditioner, oil fired winter air conditioners, "Oilmaster" boiler, oil fired "Thermaster" gravity pipe furnace, coal fired "Triple Fire" boiler.

THERMOMATIC CORP., Church & Elm Sts., Willoughby, Ohio.—Booths 7-15.

THERMOSEAL DIV.—see F. C. RUSSELL CO.

THRUSH & CO., H. A., 21 E. Riverside Dr., Peru, Ind.—Booths 421 & 422.
In attendance: George H. Fox, R. E. Lund, Carl Fritsche, E. D. Noland.
Exhibiting: Water circulators, flow control valves, relief valves, automatic filling valves, water heaters, one pipe fittings, electrical controls, and featuring improved water circulator and "Ajustaflo" single main system with new adjustable one pipe fitting.

TIMKEN SILENT AUTOMATIC DIV., TIMKEN-DETROIT AXLE CO., 100 Clark St., Detroit 32, Mich.—Booths 76-77.

TINNERMAN PRODUCTS, INC., 2038 Fulton Rd., Cleveland 13, Ohio—Booths 334-336.
In attendance: Geo. A. Tinnerman, H. R. Russell, Wm. M. Buttriss, J. F. Kurt, A. G. Breuneis, H. W. Bailey.
Exhibiting: "Speed Nuts," "Speed Clips," and "Speed Clamps"—patented fastening devices. Hundreds of the exhibitor's more than 4000 spring tension fastening devices will be displayed, featuring those particularly applicable to heating, ventilating, and air conditioning equipment.

TITUSVILLE SALES CO.—see NEW YORKER STEEL BOILER CO., INC.

TORIDHEET DIV., CLEVELAND STEEL PRODUCTS CORP., 7306 Madison Ave., Cleveland 2, Ohio.—Booths 44B & 43.
In attendance: W. J. Smith, Sr., W. J. Smith, Jr., J. L. O'Brien, R. J. Lucas, L. F. Dienst, L. D. Clough, J. F. Donnelly, Jos. Lappin, W. J. Watchler.
Exhibiting: Rotary wall flame oil burners, pressure atomizing oil burners, oil fired winter air conditioning units, oil fired boiler burner units, gas fired winter air conditioning units. Featuring winter air conditioner fired with rotary wall flame burner, with "Nu-Ropeller" oil recirculation.

TRION, INC., 1000 Island Ave., McKees Rocks, Pa.—Booth 506.
In attendance: E. W. Meyers, Jr., John W. Frazier, W. Allen Stone, Henry C. Fry.
Exhibiting: Electric air filters, 40 percent scale working model, large size cabinet models not previously available (1200, 1800, 2400, and 3600 cfm).

TRIPLEX HEATING SPECIALTY CO., 248 N. Grant St., Peru, Ind.—Booth 666.
In attendance: W. F. Petty, L. H. Wise, L. R. Peters.
Exhibiting: Hot water circulators, flow control valves, pressure control valves, indirect hot water heaters, tankless hot water heaters, hot water electrical controls, water mixing valves, air vent valves, cellar drainers, barometric draft dampers.

TURNBULL MFG. & DISTRIBUTING CO. (formerly Effecto Grille Co.), 9930 Freeland Ave., Detroit 27, Mich.—Booths 519-520.
In attendance: R. S. Turnbull, John J. Manica, Harold S. Blair, J. Scott.
Exhibiting: Complete line of gravity and forced air registers and grilles, and featuring a new gravity register with removable face, in modern streamlined styling.

TUTTLE & BAILEY, INC., Corbin Ave., New Britain, Conn.—Booths 425 & 426.
In attendance: Stanley Hart, J. H. Smart, L. Zavorski, R. D. Tutt, J. F. Wolff, R. S. Rickabaugh.
Exhibiting: Ceiling diffusers, grilles, registers, air control devices, copper convectors. New type "Aerofuse" diffuser with effective area control, "Tri-Flex" design supply registers and grilles, and "Aerovane" design return grilles and registers will be featured.

UNITED HEATING INDUSTRIES, INC., Coopersburg, Pa.—Booth 446.

UNITED STATES AIR CONDITIONING CORP., Como Ave., S. E. at 33rd St., Minneapolis 14, Minn.—Booths 497-498.
In attendance: L. P. Hanson, N. Downey, C. F. Hawkinson, R. D. McLain, W. Ewald, G. Miller.
Exhibiting: "usAIRco" refrigerated "Kooler-aire," gas fired unit heater, heating and cooling unit, type "FC" blower, type "BI" blower, and coil sections—DX, non freeze, and water. The refrigerated "Kooler-aire" unit is completely redesigned for 1948, the gas heater is a new product which has just gone into production, the blowers are of new design, and the heating and cooling unit is the latest addition to the exhibitor's line.

UNITED STATES RADIATOR CORP. AND PACIFIC STEEL BOILER DIV., 300 Buhl Bldg., Detroit 31, Mich.—Booths 217-219-221-223.

In attendance: C. M. Baumgardner, H. B. Steggall, D. E. Welsh, T. F. Gessner, J. C. Canyock, E. E. Hall, Dan Parker, W. S. Ivison, V. W. Blackney, T. R. Flanagan, E. F. Hackett, T. C. Lewis, E. S. Grady, J. C. McDonald.

Exhibiting: Boilers, radiators, warm air furnaces, controls, and heating accessories—complete equipment for the heating trade.

UNITED STATES STEEL CORP., 436 Seventh Ave., Pittsburgh 30, Pa.—Booths 311-313.

Exhibiting: Stainless steel for ducts; "USS National" pipe for radiant heating. Featured will be a demonstration showing workability of stainless steel, forming, numerous parts from 20 ga 18-8 stainless steel.

UNITED STATES STEEL SUPPLY CO., 1319 W. Wabansia Ave., Chicago, Ill.—Booths 311-313.

V. & E. PRODUCTS, INC., Schuylkill Haven, Pa.—Booth 326.

VIBRATION ELIMINATOR CO., 10-28 47th Ave., Long Island City 1, N. Y.—Booth 482.

VIKING MFG. CORP., 1747 Chester Ave., Cleveland, Ohio.—Booths 21 & 22.

In attendance: J. L. Mahoney, T. C. Kitchen, M. C. Cameron, J. G. Baker, L. H. Gary, W. R. Bennett, H. S. Frasher, P. B. Patton, W. R. Jones, T. H. Hall, Jr., J. E. Roche, Jr., J. D. Prasifka.

Exhibiting: Oil space heaters, year 'round air conditioners, gas furnaces, oil furnaces, oil boilers, oil floor furnaces, oil water heaters, "Flatpak" aluminum ductwork, conversion burners, condensing units. Featuring several new units utilizing specially designed vaporizing burner with double shroud to preheat air used for combustion, forced air being introduced to burner at both high and low fire; "Flatpak" aluminum ductwork—a complete system of preformed aluminum ductwork, precision made on factory dies, fittings being shipped knocked down and nested for savings in shipping, storing, handling, and assembling; new model console heater with special natural grain walnut finish, patented combustion chamber, and efficient 10 in. vaporizing burner. (humidifier, fuel tank, remote control thermostat package and blower package are available.)

VINCO CO., INC., 305 E. 45th St., New York 17, N. Y.—Booths 477-478.

In attendance: Leo Sherman, Donald Carton, Donald Cauldwell, John Natoli.

Exhibiting: Boiler cleaner, liquid boiler seal, "Soot-Off," rust preventer, field test kit, featuring two glass model heating systems.

VOLCANO BURNER CORP., 3612 E. Tremont Ave., New York 61, N. Y.—Booths 449-450.

In attendance: Ernest L. Camerin, William R. Camerin, Vincent Camerin, William J. Coyle, Miss June Camerin, Arthur Whorlow.

Exhibiting: Oil burners, "Quiet Flame" oil burners, boiler-burner units, warm air air conditioning unit, "Kut-A-Syz" couplings (new flexible rubber couplings which can be cut to any size required with a hacksaw).

VOSS CO. INC., J. H. H., 785 E. 144th St., New York 54, N. Y.—Booths 607-608.

In attendance: Mrs. Alice C. Voss, Karl Schartel.

Exhibiting: Compressor valves.

VULCAN RADIATOR CO., 26 Francis Ave., Hartford 6, Conn.—Booth 415.

In attendance: R. B. Sweet, F. W. Arnold, P. W. Mortlock, T. F. O'Connor, Jr., G. F. Waterman.

Exhibiting: Finned tube radiation, featuring "Radi-Vector" baseboard radiation and the "Vulect" electric convector.

WALTON LABORATORIES, INC., 1186 Grove St., Irvington 11, N. J.—Booths 437-438-439.

In attendance: Wm. Feldermann, John B. Feldermann, J. R. Lewis, Ben Dickinson, C. F. Jones, Jr.

Exhibiting: Industrial humidifier, portable domestic table humidifier, portable cabinet humidifier. The "Fanlamp"—a floor lamp that can also be used as a heat lamp, sun lamp, hair drier, and direct fan—will be featured.

WATERFILM BOILERS, INC., 154 Ogden Ave., Jersey City 7, N. J.—Booths 36 & 37.

In attendance: Arthur R. Hanson, E. Wodecka.
Exhibiting: Vertical tubular 400 ft boiler; "Deluxe"; sectional, partially assembled.

WATERMAN-WATERBURY CO., 1121 Jackson St., N. E., Minneapolis 13, Minn.—Booth 20.

In attendance: H. G. Cross, Dave Sedgwick, Jack White, Jim Bazille, Ted Doering, Ira Metcalf, Otto Griefnow, Roy Lonson, Brighton Eddy, Stuart Smith, Howard Weller, Don Mitchell.

Exhibiting: Oil fired air conditioners, vaporizing oil burner air conditioner, and featuring coal fired furnace.

WATSON-STILLMAN CO., Aldene Rd., Roselle, N. J.—Booth 387.

In attendance: A. G. York, J. P. Bittenbinder, S. Jones, C. Cone, C. Kennedy, J. Cotter, J. Ocello.

Exhibiting: Forged steel pipe fittings for low and high temperature, low and high pressure, and corrosive and sanitary service in both screw-end and socket welding types.

WEIL-McLAIN CO., Michigan City, Ind.—Booths 508-9-10-11.

In attendance: Martin Weil, W. R. Stockwell, E. R. Westphal, P. R. Stockwell, T. D. Casserly, Norman E. Westphal, Henry Brenner, Robert Kuntz, Emil Maeder, Thomas G. Regan.

Exhibiting: New "87" series all-purpose boiler; "68" series automatic fired boiler; round series boiler; "Raydiant" and "Solray" radiation.

WHALE PRODUCTS CORP., 760 Flushing Ave., Brooklyn 6, N. Y.—Booth 410.

WHITE MFG. CO., 2362 University Ave., St. Paul 4, Minn.—Booth 540.

In attendance: Charles E. White, Leslie E. Turner.

Exhibiting: "Master" damper regulator and limit controls, "Blowertrol" (an electrically operated variable speed control), new damper regulator with indicating thermostat.

WHITE-RODGERS ELECTRIC CO., 209 Cass Ave., St. Louis 6, Mo.—Booths 7-15.

WILSON CO., H. A., 105 Chestnut St., Newark 5, N. J.—Booth 207.

WILSON & CO., INC., HAIR FILTER DIV., 4100 S. Ashland Ave., Chicago 9, Ill.—Booth 323.

In attendance: Andy Andresen, Mrs. A. C. Andresen, W. F. Birney, Harold Winningham, Neil Reisdorph, Tom Osberger, William Clark.

Exhibiting: Hair filters, "Edgeseal" hair filters. Display will demonstrate advantages of hair as natural medium for filtering of air in winter and summer air conditioning equipment.

WING MFG. CO., L. J., 154 W. 14th St., New York 11, N. Y.—Booth 34.

In attendance: Harry S. Wheller, Charles H. Smith, T. R. Peyrek, J. M. Hancock, F. H. Anstice, R. N. Hosey, E. H. Hubert, S. R. Glanz, G. G. Nash, Guy Mankin, J. R. Purcell, R. P. Stebbins, Harry S. Wheller, Jr., G. M. Comstock, Don Campbell, Gene Edwards, E. E. Scott, T. F. Schenke, W. B. Hoyt, Sr., W. B. Hoyt, Jr., W. Hough, Willard G. Myers, Carl F. Lorey.

Exhibiting: Turbine driven revolving unit heater, motor driven revolving unit heater, "Wingfoil" straight line duct fan, axial flow marine ventilating fan, forced draft turbine blower, forced draft motor driven blower, elbow draft inducer, auxiliary steam turbine.

WORTHINGTON PUMP AND MACHINERY CORP., Worthington Ave., Harrison, N. J.—Booths 30-31, 44A-45.

In attendance: M. M. Lawler, W. F. Bishop, P. H. Shaw, F. J. Watt, E. R. Michel, D. H. McCuaig, H. D. Moore, J. Conrad, J. W. Koper.

Exhibiting: 5 ton self contained hermetically sealed air conditioning unit, large centrifugal refrigeration unit, cutaway "Freon-12" compressor, ammonia condensing unit, evaporative condenser. Featuring new hermetically sealed, motor-mated compressor, used in 3 and 5 ton packaged air conditioners, mounted model of cutaway "Freon-12" refrigeration compressor, and evaporative condenser.

XXth CENTURY HEATING & VENTILATING CO., Ira Ave., Akron, Ohio.—Booths 7-15.

YORK CORP., York, Pa.—Booths 74-75.

In attendance: J. R. Hertzler, J. M. Lambert, F. C. Wood, J. Donald Smith, A. Christensen, R. K. Serfass, A. N. Barnes, A. J. Cordrey, C. W. Egbert, J. E. Fitzsimmons, J. W. Floreth, L. J. Jacobson, J. Krsnak, C. Weigand, Leen E. Kinley.

Exhibiting: A representative selection of refrigeration and air conditioning equipment, with emphasis on the exhibitor's turbo compressor systems.

YORK SHIPLEY, INC., INDUSTRIAL DIV., York, Pa.—Booths 358-374.

YULA WATER HEATERS, INC., 166 W. 225th St., New York 63, N. Y.—Booth 619.

In attendance: Henry F. Yula, Robert B. Zinser, Ralph W. Yula, Frank L. Maurer, Harry Swenson, W. H. Flickinger.

Exhibiting: In-boiler tankless heaters, indirect shell tankless heaters, mixing valves, fuel oil heaters, "C.H.M." in-boiler heaters, "C.H.M." shell tankless heaters, pressure reducing valves, dual control pressure reducing and pressure. relief valves, flow control valves, circulating pumps, etc.

Heating, Piping & Air Conditioning

AMERICAN SOCIETY of HEATING and VENTILATING ENGINEERS

Journal Section

The Discharge of Air From a Long Slot

By Alfred Koestel* and G. L. Tuve**, Cleveland, Ohio

This paper is the result of research sponsored by the *American Society of Heating and Ventilating Engineers* in cooperation with Case Institute of Technology

The Problem

The question of static pressure regain along the duct is encountered in any design that involves a dead-end duct of uniform cross-section with side outlets uniformly spaced. The basic form is a long slot in the side of a long duct. If the duct is small as compared with the slot, the eddy losses are high. The high duct velocity at the upstream end results in the discharge of air at an acute angle with the axis of the duct, (See Fig. 1). Proper selection of duct dimensions and slot size must be based on accurate knowledge of both the air flow at the slot and the resulting air-stream pattern in the room.

SUMMARY—The long slot is a basic device for distributing air for ventilation, mixing, air-shielding or smoke dissipation. It is here demonstrated that when a long slot receives its air supply from one end only, the important design factor is the ratio of the area of the slot to the area of the supply duct. Methods are presented for closely approximating the shape of the air stream in the discharge space, and for designing the slot and its supply duct

Results and Conclusions

The controlling factor in the air-stream performance was found to be the ratio of the area of the slot to the area of the supply duct. If this ratio is held constant, the general shape of the stream will be practically independent of the pressure in the supply duct or of the width of the slot or of the aspect ratio of the duct. At the upstream end of the slot, the emanating angle of the air stream is the vector resultant of the axial component of velocity head and the perpendicular component of static head in the duct. The air-discharge velocity along the length of the slot remains almost constant, but its direction changes, (See Fig. 1). The final direction of the air stream in the room may be obtained by

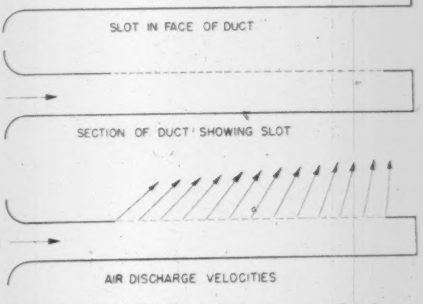

Fig. 1—Long slot with air supply from one end only

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For presentation at the 54th Annual Meeting of the American Society of Heating and Ventilating Engineers, New York, N. Y. February 1948.

adding vectorially the individual velocities at each increment of slot length. These conclusions could be anticipated by analysis, but they have been thoroughly checked by experiment.

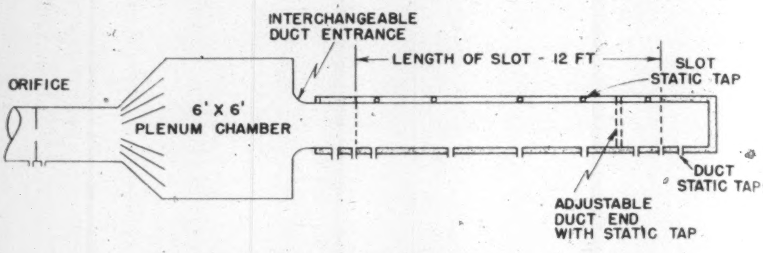


Fig. 2—Sectional diagram of slot test unit

Experimental Approach

This study was confined to the performance of an air stream discharged from a slot of constant width located in the side of a duct of uniform cross-section. Slot lengths of 6 to 12 ft were used, the slots being ¼ in. to 1½ in. wide, and the air was supplied from one end of the duct only. Both rounded entrance or nozzle-type slots, and square edged or orifice-type slots were tested, using square and rectangular ducts, (6 in. x 6 in., 10 in. x 10 in. and 6⅛ in. x 16½ in.). All tests were run under isothermal conditions with air velocities at the slot face of 750 to 4300 fpm, volumes of 500 to 3200 cfm.

Slot width and alignment were accurately maintained and frequently checked with micrometer and level. Air supply to the test duct was from a large plenum through a rounded entrance nozzle of 3 in. radius, (see Fig. 2). Air was measured by calibrated orifices and frequent checks were made to guard against leakage. Sidewall static taps were made to *ASME* code specifications, and sidewall static pressures were checked by using a static tube in the duct. Both static and impact pressures were read on calibrated inclined gages, to 0.002 in. water, and pressure gradients were measured by differential connection of gages.

The angle of the air discharge from the slot was measured by fine threads read on a protractor scale, and by a specially developed null-type double impact tube that was sensitive to less than ± 0.5 deg of arc, measured on a 12 in. protractor.

The general air stream pattern in the room was determined by a ribbon-grid indicator and by making traverses with both the rotating-vane anemometer and the velometer.

Velocity and Energy Conversions

Energy is supplied at the duct entrance, (Fig. 3), as kinetic energy, measured by velocity pressure, and as potential energy, measured by static pressure. The ratio of the velocity pressure to the sum of velocity plus static, will hereafter be called the *percent kinetic energy* (percent *KE*) in the supply duct. It is apparent that with a given area of supply duct, A_d, Fig. 3, the percent kinetic energy in the duct will increase as the area of the outlet is increased. With an area ratio of unity (open end duct) the percent *KE* is practically 100. By comparing the nozzle with the orifice, (Fig. 3), it is seen that the controlling outlet area is the minimum stream area or vena contracta. But since it is very difficult to measure the area of the vena contracta, the outlet velocity V_o is defined in all cases as the volume divided by the *measured* outlet area, A_o. For the long slot the measured area is called A_s.

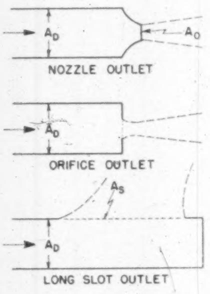


Fig. 3—Three basic types of air discharge outlets

Writing the energy equation at sections A_d and A_o for a *perfect* nozzle and an incompressible fluid in the usual form:

$$V_o = \sqrt{2g\left(\frac{P_d}{\rho} + \frac{V_d^2}{2g}\right)} = \frac{A_d V_d}{A_o} \qquad (1)$$

where

V_o = outlet velocity in feet per second

g = the acceleration due to gravity or 32.17 feet per (second) (second)

P_d = duct static pressure in pounds per square foot

ρ = air density in pounds per cubic foot

V_d = duct air velocity in feet per second

A_d = duct area in square feet

A_o = outlet area in square feet

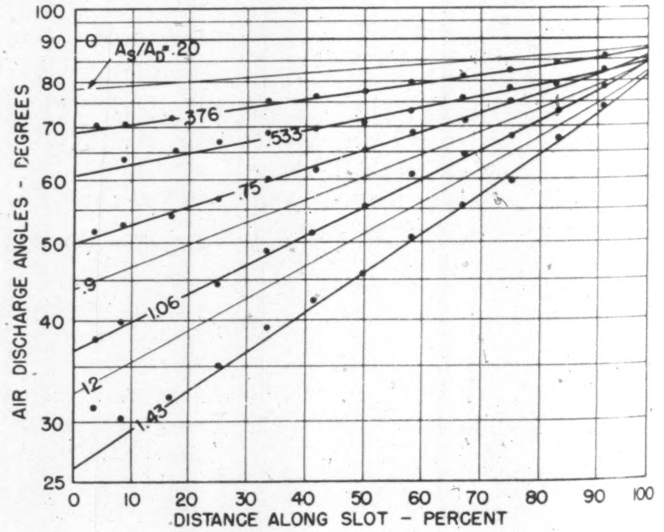


Fig. 4—Air-discharge angles for rounded-entrance slots

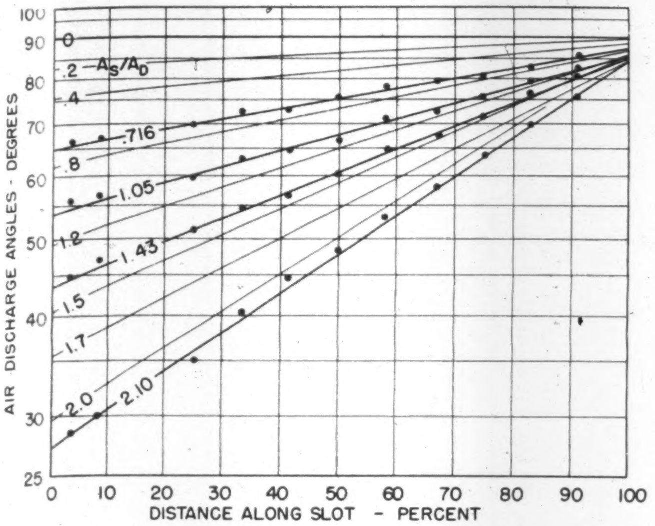


Fig. 5—Air-discharge angles for square-edged slots

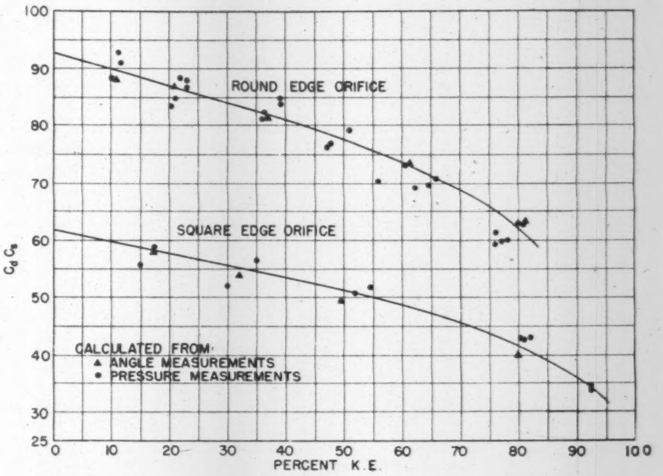


Fig. 7—Coefficients for energy loss and jet contraction determined experimentally by two independent methods

All actual outlet devices, Fig. 3, depart from the ideal performance indicated by Equation 1. For a nozzle or orifice at the end of the duct, two factors must be considered, (1) the true stream area of the vena contracta is less than the measured area, and (2) there is an energy loss due to friction. The corrections for these two departures from the ideal nozzle are embodied in the common multiplying factor C_c, called the *coefficient of discharge.* It is less than unity, and must be determined by experiment.

Long-slot outlets are also subject to jet contraction and friction and hence a coefficient of discharge C_c should be applied. When the slot-duct is supplied with air from one end only, two new factors need to be considered, *viz.,* (1) the loss due to imperfect conversion of velocity head into static head (static regain) and (2) a decrease in effective slot area (or in the perpendicular component of velocity) due to the acute discharge angles along the slot, Fig. 1. This decrease in effective slot area may be determined by an experimental integration of the projected areas normal to the stream lines along the slot. Careful measurements of these stream-line angles have resulted in the curves of Figs. 4 and 5. The results of such a step-by-step summation or integration of areas, applied successively to slots of various sizes, are shown by the dash line in Fig. 6. The horizontal distance, Fig. 6, from curve A for the theoretical nozzle to curve B for the theoretical slot, thus represents a reduction in capacity due to the acute discharge angles in the case of the slot. The distance between curve B and curve C is due to the combined effect of imperfect static regain and of coefficient of discharge of a rounded entrance slot. The distance between curve C and curve D is due to the added jet contraction of a square-edged slot. This difference between the rounded entrance slot and the square-edged slot may also be checked from Fig. 7, and by comparing Fig. 4 with Fig. 5. In view of the difficulty of making an accurate separation of these three deviations from the ideal slot performance, their combined effect has been shown on Fig. 7, in terms of the coefficients C_d x C_s. When the slot is supplied from a large plenum chamber, the percent *KE* is zero, the discharge angles are all 90 deg and C_s becomes unity. The slot coefficient C_s might be called the area-energy correction for an end-supplied slot. Rewriting

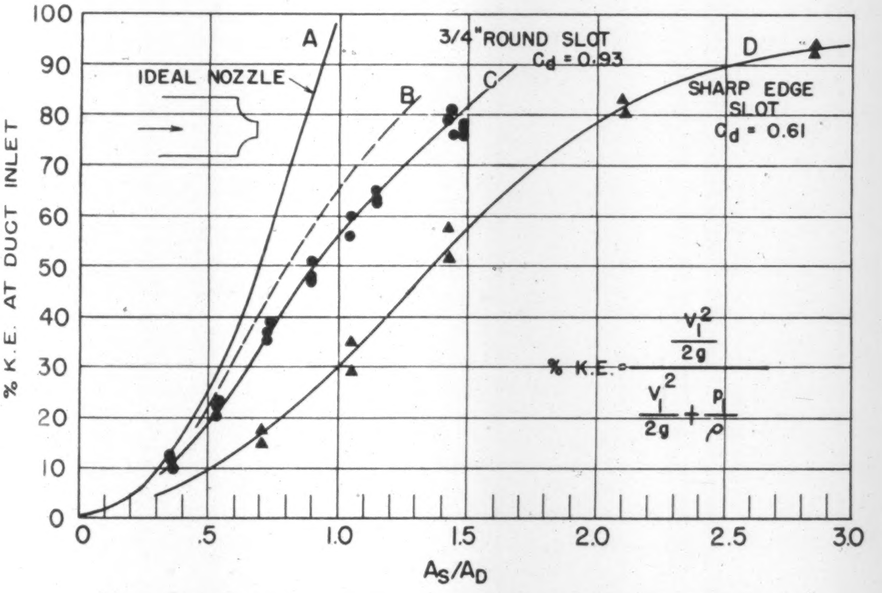


Fig. 6—Basic design curves C and D, indicating relation between area-ratio and initial duct velocity

Equation 1 for the actual slot, it becomes:

$$V_s = C_dC_s\sqrt{2g\left(\frac{P_d}{\rho}+\frac{V_d^2}{2g}\right)}$$
$$= \frac{A_dV_d}{A_s}\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Transposing and simplifying:

$$\frac{A_s}{A_d} \times C_dC_s = \sqrt{\frac{\dfrac{V_d^2}{2g}}{\dfrac{P_d}{\rho}+\dfrac{V_d^2}{2g}}}$$
$$= \sqrt{\%\ KE}\ldots\ldots(3)$$

where

V_s = air velocity at the slot in feet per second

C_dC_s = coefficients for energy loss and jet contraction

g = acceleration due to gravity or 32.17 feet per (second) (second)

P_d = duct static pressure in pounds per square foot

ρ = air density in pounds per cubic foot

V_d = duct air velocity in feet per second

A_d = duct area in square feet

A_s = area of slot in square feet

KE = kinetic energy

The reason why the curve for the ideal nozzle, Fig. 6, becomes a parabola, is apparent from the existence of the square root relationship. Equation 3 may be used for obtaining the slot area A_s, the duct area A_d or the percent KE through the use of $C_d \times C_s$ from Fig. 7, or the relationship may be obtained directly from the graphical representation of Equation 3, which is Fig. 6. The values in Fig. 6, curves C and D were obtained by simply measuring the pressure in the supply duct and the volume of air discharged, for various sizes of duct and slot.

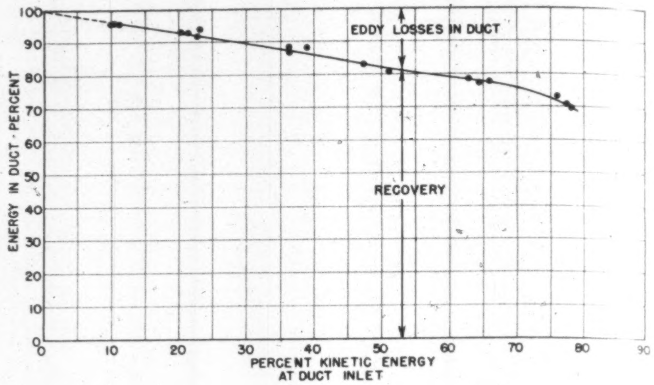


Fig. 9 — Relation between velocity in approach duct and static regain

Data and Results

Static Regain: In all cases there was a static regain along the duct and measurements of the static pressure gave a smooth curve similar to Fig. 8. This curve is of course an extreme example, since the energy at the duct entrance in this case was represented by only about 13 percent static pressure and 87 percent velocity pressure. Fig. 9 provides a summary of the static regain data in that it gives the locus of the end-points of the curves similar to Fig. 8. Each point in Fig. 9 thus represents the final static pressure at the end of the duct as a percentage of the total pressure energy at the duct inlet.

Air Discharge Angles: The angle of the air discharge along the slot was found to vary in a straight line, Figs. 4 and 5, and these angles were dependent on the area-ratio and independent of the air velocity. Slight exceptions to this statement were noted with very large slots or very low air velocities. The justification for concluding that the air discharge angle is independent of the quantity discharged from a given slot is illustrated by a sample curve, Fig. 10. The curves of Figs. 4 and 5 should prove useful for the design of turning vanes.

Air Stream in Room: The changing character of the air stream in the room, as the slot size is increased, is shown by Fig. 11. In Fig. 12 the stream profiles or stream-envelope shapes are indicated, for two rates of air flow from the same slot. Very little change could be observed of the shape of the stream near the slot irrespective of air volume, so that the room air-stream patterns of Fig. 11 may be considered as applying to any rate of flow. The dotted lines, Fig. 11, indicate the end of the stream when the cfm rate of air discharge is relatively low. The final or resultant air-stream angle, (Θ in Fig. 12), was found by ribbon-grid traverses and anemometer measurements. In

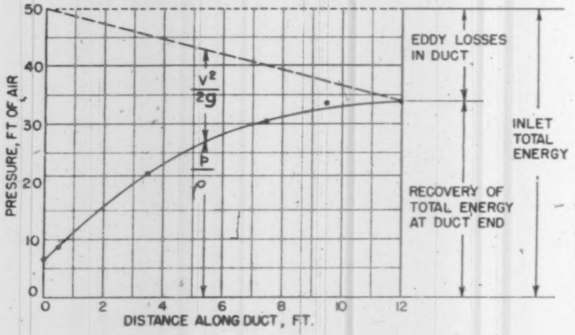


Fig. 8—Typical static regain curve

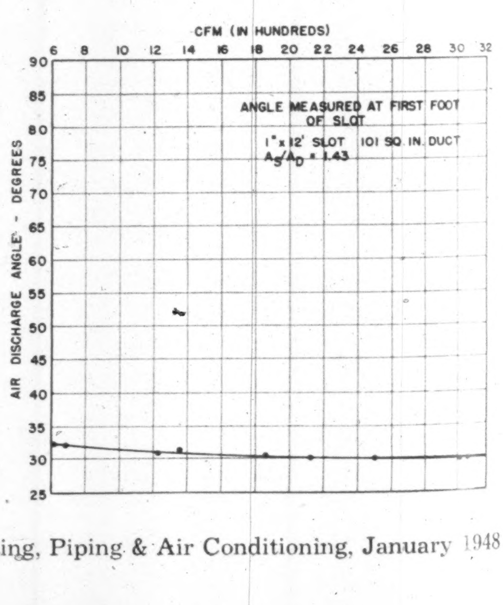


Fig. 10—Variation of discharge angle with rate of flow

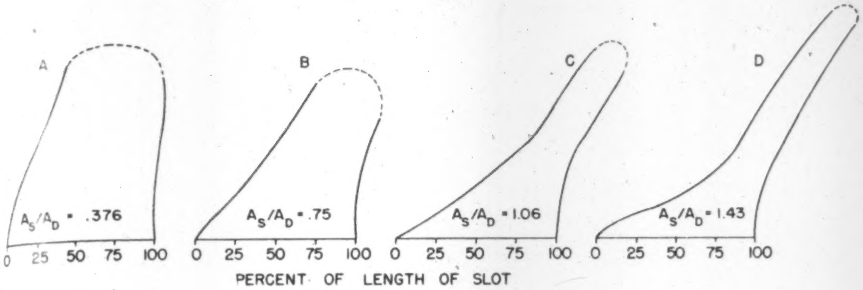


Fig. 11—Shape of air-stream envelopes as slot area is increased

all cases this final angle θ was approximately equal to the angle obtained as the vector sum of the individual angles of Figs. 4 and 5. These resultant angles are shown by Fig. 13.

The throw of the air stream from slots of aspect ratio of 100 or more is much shorter than that from a circular or rectangular grille. Since the throw depends on the ratio of slot to duct area as well as on the discharge velocity and the total outlet area, the problem is too complicated for simple presentation, and no attempt will be made here to give quantitative data for general application. Figs. 11 and 12 will serve as a rough guide.

Example of Practical Application

As an example of the design of a rounded-entrance slot-type air distribution unit, assume that it is desired to distribute 1500 cfm of primary air from a slot 15 ft long. It is further specified that the velocity in the approach duct shall be 2000 fpm and that the resultant direction of the air discharge stream shall not be less than 60 deg.

Required: Duct size, slot width, static pressure in the supply duct, and the approximate pattern of the air stream in the room.

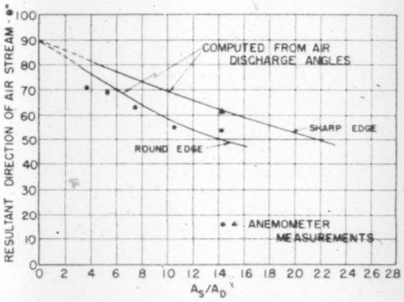


Fig. 13—Final or resultant stream angle from slot-type outlet

Solution: In this problem as stated, there is a choice between a narrow slot giving a nearly symmetrical stream pattern, and a wider slot that gives a 60 deg stream but requires considerably less static pressure in the supply duct. In any case the duct area will be 1500/2000 = 0.75 sq ft, giving a duct about 10.5 in. square or an equivalent rectangular duct, say 18 in. x 6 in. To illustrate the possibilities, the solutions for 60 deg and 75 deg final stream angles are given as follows:

	60 Deg Stream	75 Deg Stream
1. Area ratio, slot to duct, for the given stream angle, From Fig. 13 A_s/A_d	0.94	0.42
2. Corresponding percentage of kinetic energy as fraction of total energy at duct entrance, From Fig. 6 %	52	13.5
3. Velocity pressure in duct corresponding to 2000 fpm, in. water ...	0.25	0.25
4. Static pressure in duct, in. water: $\frac{\text{Item 3}}{\text{Item 2}}$ x 100 — Item 3	0.23	1.35
5. Slot width (from Item 1), inches	0.56	0.25

The approximate shape of the air stream in the room space may be estimated from Fig. 11, or an angle layout similar to Fig. 12 may be made from the data in Figs. 4 and 13. The two cases in this example will be very similar to A and C in Fig. 11. If it is desired to control the air stream in the room by means of turning vanes in the slot, these vanes should be set at the angles given in Fig. 4.

Acknowledgments

The work reported in this paper has been carried on over a period of two years under the general direction of the ASHVE Technical Advisory Committee on Air Distribution and Air Friction. Many persons have contributed. Special thanks are due to R. L. Larson, instructor in mechanical engineering, and J. R. Ruetenik, graduate assistant at Case, for their contributions to both the analysis and the experimental work. Recognition is due to J. R. Jeromson and R. L. Tuve who pioneered the experimental work, and to Miss Ruth Ehrenfeld who acted as an observer and also prepared all the figures.

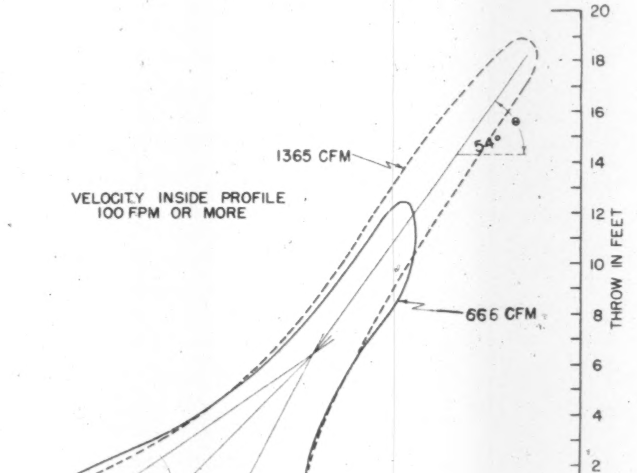
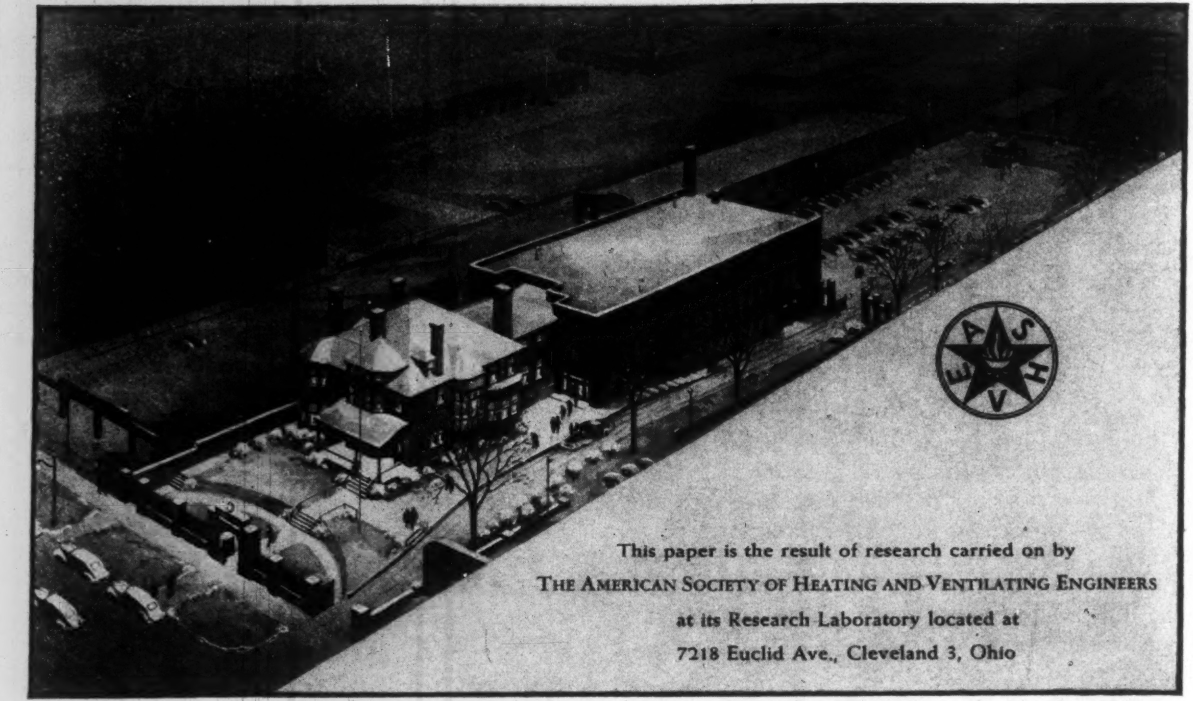


Fig. 12 — Details of air-stream shape with large slot-to-duct ratio. Data from 1 in. x 12 ft slot, A_s/A_d = 1.43; same as D in Fig. 11


This paper is the result of research carried on by
THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS
at its Research Laboratory located at
7218 Euclid Ave., Cleveland 3, Ohio

Measurements of Solar Heat Transmission Through Flat Glass

By George V. Parmelee*, Warren W. Aubele**, and Richard G. Huebscher***,
Cleveland, Ohio

SUMMARY—A report is made of progress in the measurement of solar heat transmission by window glass and glass block. Data are given for direct and diffuse solar energy transmittance by single flat glass and for total heat gain through the glass. A calorimeter apparatus used to measure these quantities is described. Data obtained from pyrheliometric and spectro-photometric tests are also given. The influence of type of glass, angle of incidence, solar energy distribution, and temperature is shown

Introduction

In 1945 the ASHVE Technical Advisory Committee on Glass† recommended to the Committee on Research that experimental measurements be made of the solar heat transmission characteristics of various types of glass and glass block. These measurements were to be made in sunlight and were to be subject to the usual vagaries of the weather. Following completion of these tests, the effectiveness of various standard shading devices in reducing solar heat gain through windows and glass block was to be studied. It is the purpose of these experiments to develop a body of physical data which can be related to readily-measured physical properties of glass and to solar and atmospheric conditions. From this information are to be developed design data for the many and varied circumstances where window glass and glass block are used. These range from homes, office buildings, factories, and solar heat collectors to air conditioned transportation facilities of the sea, land, and air.

Most of the test work has been carried out with a specially designed and constructed calorimeter, which will be described only briefly in this report. Other methods, however, such as spectro-photometric and pyrheliometric transmittance tests, have been freely used to obtain much needed primary and supplementary data. It is expected that new techniques may have to be developed to find suitable answers to some of the questions which the test work has already raised.

The transmission of solar energy by glass and the conduction of heat to, from, and through glass involve many variables. Because they are of the most immediate interest, this

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For presentation at the 54th Annual Meeting of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, New York, N. Y. February 1948.

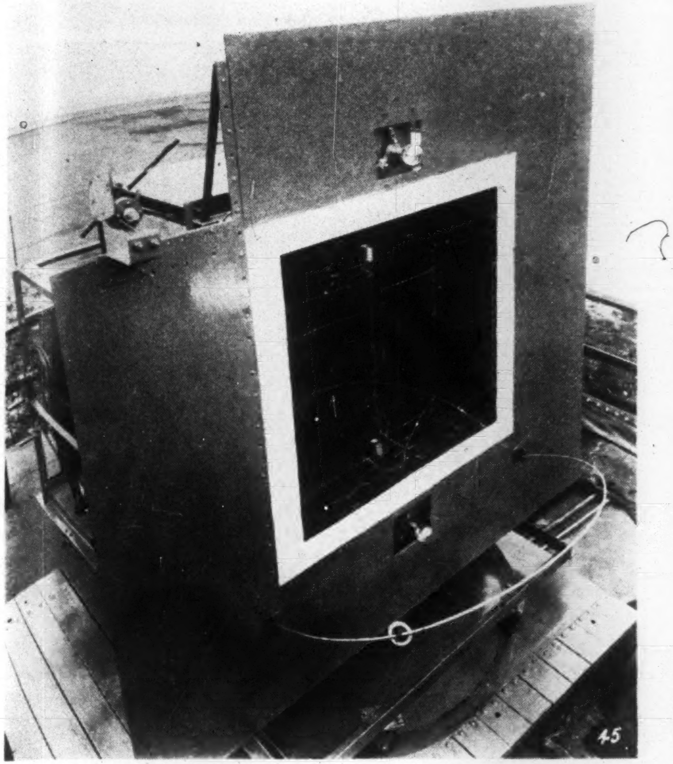

Fig. 1—Close up view of calorimeter in location for test

paper will be chiefly concerned with the following:

1. The relation between spectral transmission characteristics of various types of glass, angle of the incident ray, and solar energy transmission for both direct and diffuse radiation.
2. Some examples of heat gain via glass as affected by temperature, atmospheric conditions, and solar radiation.

This paper is restricted to a report of calorimeter tests made on single flat glass of four different types. Transmittance tests made by pyrheliometric methods for six types of glass and spectro-photometric data for four types are also reported. Some data, not reported, have been secured regarding the effects of solar energy distribution and of so-called nocturnal radiation. Since more data are needed to present a complete analysis of the problem, this paper must be considered as a progress report. *As such, the findings presented may be subject to future modifications or different interpretations.*

Description of Apparatus

The Calorimeter

The principal piece of equipment used in the tests was a calorimeter. This consisted of a frame for holding a 4 ft square sheet of glass and having an insulated blackened solar heat absorbing section attached to the back of the frame. In order that solar energy transmitted by the glass would be absorbed completely, the ratio of absorbing surface to window opening was made about 4 to 1. Its shape was a simple geometrical figure which would direct the greater part of any radiation reflected from its surface to other parts of the surface to be absorbed rather than to direct it out through the glass. The window frame was 8 in. deep in order to accommodate multiple glazing, glass block panels, and inside shading devices.

Fig. 1 clearly shows the calorimeter surface (made of aluminum) to which cooling tubes were brazed in continuous contact. The tube layout was designed to give as nearly as possible a uniform temperature throughout the absorbing surface. The shell was covered with a 2 in. layer of batt type insulation. To this was added from 3 to 9 in. of blanket insulation sufficient to completely fill the rectangular box which covered the back side of the shell. The calorimeter surface was given one coat of primer, one coat of flat black, and finally a coat of lampblack.

A mixture of water and ethylene glycol was circulated through the cooling tubes. Fig. 2 shows the flow circuits in one of which a Freon-cooled heat exchanger was located.

The calorimeter assembly was set in horizontal trunnions which were in turn mounted on a structural steel framework. It was, therefore, capable of rotation to face all parts of the compass, and could be tilted through 90 deg. With the aid of the sun sight shown in Fig. 1, the window could be held at any desired angle with respect to the sun's rays. The calorimeter was assembled on the roof of a specially built test house (see Fig. 3) located near the south end of the Laboratory property. In this position the window was 15 ft above ground and was at all times unshaded from the direct rays of the sun except to the northeast and northwest in the late spring and early summer. Weather instruments were mounted on the tower shown in Fig. 3. The test house contained the pumps, refrigeration apparatus, control, recording and measuring equipment.

Instrumentation

Temperature Measurements

The temperature of the calorimeter surface was measured at 10 points by thermocouples cemented to, but electrically insulated from, the back side of the calorimeter shell. These junctions were located ⅜ in. from the centerline of the tubes, which were spaced on 1½ in. centers.

The air temperature inside the calorimeter was measured by four thermocouples 18 in. from the glass. Two were 12 in. above and two were 12 in. below the horizontal axis of the calorimeter. Each junction was shielded by two concentric aluminum foil cylinders 1 and 2 in. in diameter by 2 in. long. Each pair of cylinders was in turn shielded by a concentric semicircular water-cooled shield tied into the coolant circuit. Two of these can be seen in Fig. 1. In addition, two junctions with the described aluminum foil shields were located near the glass as shown in Fig. 1. These shields were, however, quite ineffective in sunlight as previous study (1)[1] had shown.

The temperature of the glass itself was measured by No. 36 gage thermocouples cemented with Canada balsam into shallow grooves cut into the glass by triangular abrasive stones. Four such couples were used on the inside surface, and two were installed on the outside surface.

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[1] Numerals in parentheses refer to References.

Local shielding of the junctions from the sun showed only a slight drop in emf. It was therefore concluded that they registered the glass temperature with satisfactory accuracy and that solar heat absorbed by them because of their opacity was readily conducted into the surrounding glass area.

The outdoor air temperature was measured by a shielded aspirated thermocouple. At intervals during test periods wet and dry bulb temperatures were taken by means of a sling psychrometer.

In actual test work, a group of thermocouples which measured the same quantity, such as the glass temperature, was connected in parallel at the instrument panel and the average emf recorded. Each thermocouple could, however, be checked individually, a procedure which was carried out periodically. All thermocouples were of copper-constantan wire calibrated to 0.1 F. Emf's were measured with an electronic indicating potentiometer with 0 to 5 millivolt scale.

Wind Velocity

The wind velocity was measured by a calibrated cup-type anemometer which operated a magnetic revolution counter and was capable of registering velocities as low as 2.5 mph. Wind direction was measured by a vane. Both instruments were mounted on the tower shown in Fig. 3.

Measurement of Solar Radiation

Measurements of total solar radiation were made with Eppley thermo-electric type pyrheliometers. Although Fig. 1 shows two such instruments mounted on the face of the calorimeter, ordinarily only one was located here and that in the lower position. The second instrument was installed on the instrument tower in order that radiation striking a horizontal plane might be correlated with that incident upon the plane of the window. Each instrument was connected to five points of a 16 point recording potentiometer. Fig. 1 shows a device which was used periodically to shade the Eppley pyrheliometer from the direct rays of the sun in order to permit a breakdown of the incident radiation into its components of direct and diffuse radiation. A similar procedure was carried out with the instrument located on the tower.

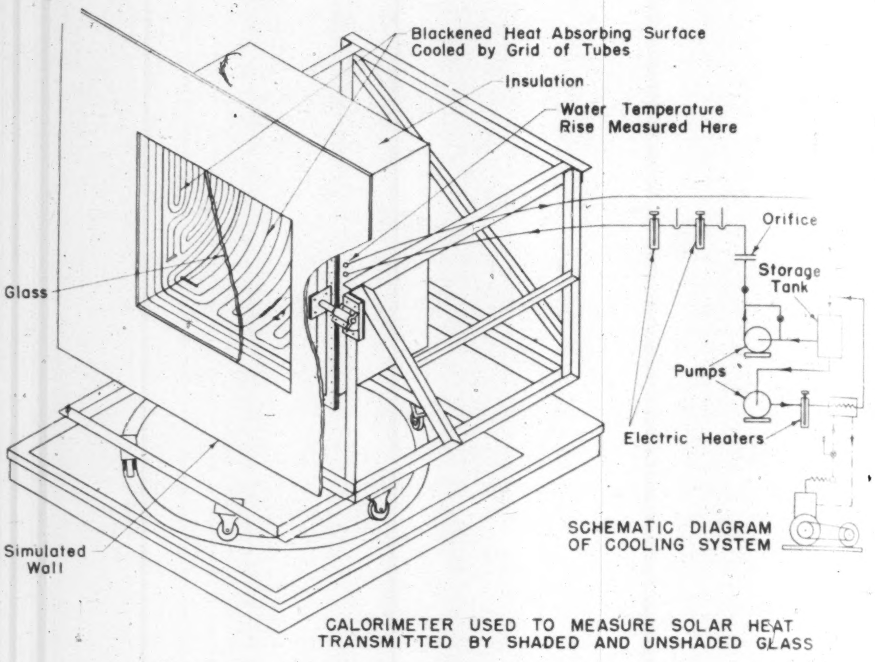

Fig. 2—Schematic arrangement of calorimeter and cooling system

These instruments were calibrated at the Laboratory by comparison with a calibrated Smithsonian Silver Disk pyrheliometer. The calibration constant was found to be dependent upon the angle at which the sun rays struck the thermo-electric element.

Measurement of Heat Absorbed in Calorimeter

Heat gain (or loss) in the calorimeter was measured by the temperature rise of the water-ethylene glycol mixture and its flow rate. The temperature rise of the fluid was measured by a copper-constantan differential thermopile. Each set of junctions, together with a single thermocouple, was located in a 1½ in. mixing tee buried in the insulating jacket of the calorimeter. The junctions were of 24 gage wire, insulated with a waterproof electrical insulating varnish and immersed directly into the fluid stream. The original thermopile of 15 junctions was replaced in the fall of 1947 by a 24 junction thermopile.

The temperature rise was recorded on five points of a 16 point recording potentiometer. The flow rate was adjusted so that the temperature rise was of the order of 2 to 3 F deg and was measured by a calibrated orifice. The specific heat of the fluid, approximately 0.80 Btu per (lb) (Fahr deg), was accurately determined from its temperature and its specific gravity which was checked periodically.

Calibration of the Calorimeter

When the calorimeter shell was covered with the 2 in. layer of insulation, 17 differential thermocouples were distributed over equal areas of its surface. One junction was attached to the back side of the shell by electrical insulating cement. The second was attached to the center of a 5 in. square aluminum plate fixed to maintain a 2 in. distance from the shell. Therefore, the temperature drop across this layer of insulation was a measure of the loss or gain.

The completely assembled apparatus was calibrated both in the Laboratory and out-of-doors. A sheet of ½ in. insulating board was installed and sealed in the window opening. Four sets of differential thermocouples were installed in this *blank* panel at the centers of equal

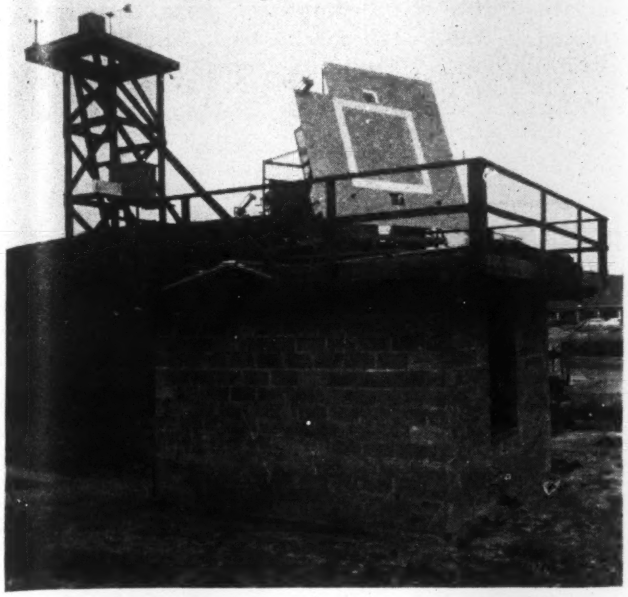

Fig. 3 — Apparatus for measurement of solar radiation transmission mounted on roof of specially built test house

areas to form four heat meters. Couples were also cemented to the inside and outside surfaces of the panel to indicate surface temperatures.

In the process of calibration, fluid, either chilled or heated, was pumped through the calorimeter and its heat gain or loss noted. This value, from which was deducted the heat flow through the blank panel, represented the calibration factor for the given millivolt drop across the insulating jacket and for the existing differential temperature between the mean fluid temperature and the metal casing of the calorimeter. Heat flow through the blank panel was established by cutting out the heat meter sections and checking them in a standard hot plate tester.

Because heat could enter the calorimeter system via the wood strips on which the glass sheets were mounted, narrow heat meters of ¼ in. plywood were fastened between the wood strip and the calorimeter surface which, at this point, extended to the glass.

Test Procedure

The calorimeter apparatus was used in two ways to measure solar heat gain through the various types of glass tested. For each sample at least one set of tests was made for fixed angles of incidence over the range 0 to 80 deg, at intervals of 5 to 10 deg. The sun sight (see Fig. 1) was set at the desired angle and then by tilting and rotating the calorimeter so that the sun's rays passed through the sight tube, this angle was held for a period of 30 to 45 min. Data were recorded at 15 min intervals and included angular positions, wind velocity, sky and cloud conditions as well as temperature and solar intensity measurements. In addition a continuous record was made of the solar intensities and the temperature rise of the coolant. These tests were carried out with the coolant supplied to the calorimeter at a constant temperature and close to the maximum outdoor air temperature expected for the day of the test.

The second type of test carried out with this apparatus was to operate it in a fixed position with the coolant supplied at a fixed temperature below (or above) the maximum outdoor temperature expected for the day of the test. As before, complete data were taken at 15 min intervals in addition to the record of the recording potentiometer.

In addition to the calorimeter tests, the transmittance of the glasses for diffuse and direct radiation was measured by pryheliometers. For diffuse transmittance, the Eppley pyrheliometer was used as follows. It was mounted in the lower position on the calorimeter (see Fig. 1), the front of which was covered with black paper to reduce reflections. A 46 in. square frame 4¾ in. deep was also mounted on the calorimeter and the apparatus placed in a vertical position out of view of the direct sun. A full sized test specimen, $48\frac{1}{2}$ by $48\frac{5}{8}$ in., was then held in front of the instrument. The frame acted as a stop and also insured that the instrument *saw* the same solid angle when it was exposed as when it was covered by the sheet of glass. Three sets of readings were made, one with the glass in front of the instrument, and two with the glass removed. The latter were made just before and immediately after the readings were taken with the glass in place. The transmittance of diffuse solar radiation was computed by dividing the second reading of the series of three by the average of the first and last readings.

Numerous measurements of the transmittance of normally incident direct solar radiation were made on small samples of glass with the Smithsonian Silver Disk pyrheliometer. These samples had been cut from the same sheet of glass as had the full sized samples. The test procedure involved three sets of readings, one with the glass in front of the instrument, one immediately before this reading, and one immediately afterwards with the sample removed from its holder. The transmittance was found from the temperature rise computed from the second set of readings divided by the average rise computed from the first and third. This method is restricted to clear days when the solar intensity is steady and is suitable only for clear, flat, unfigured glass. It is possible with this apparatus to duplicate the results of successive runs within one percent with glasses of relatively high transmittance.

Results Obtained

Calculation of Calorimeter Data

The total solar heat transmitted directly through glass equals the incident radiation minus that reflected minus that absorbed. This was found by algebraically adding the following quantities, which, in the sense used, are considered as positive:

1. Heat gain by the coolant.
2. Computed heat lost by the calorimeter to the inner surface of the glass by convection and radiation.

3. Heat lost through the calorimeter insulation.
4. Heat lost through the edge or corner block which held the glass.
5. Heat stored in the calorimeter shell by virtue of a rise in its temperature.

The temperature rise of the coolant was measured by averaging temperatures shown on the curve on the recorder chart by means of a planimeter. This average temperature multiplied by the observed flow rate and the appropriate specific heat, gave the heat gained by the coolant. The radiant heat exchange between the calorimeter surface and the glass surface was computed from the temperatures of these two surfaces and the Stefan-Boltzmann equation. The angle factor for the glass panel is unity. The effective emissivity, based upon the ratio of the two surface areas and the emissivities of glass and blackened surfaces, 0.93 and 0.97 respectively, was calculated to be 0.925. Based upon tests made over a limited temperature range with a blank panel in place of the glass, it appeared that convection heat transfer, q_c, between the inner surface of the glass and the air enclosed in the calorimeter could be expressed approximately as

$$q_c = 0.20\Delta t^{1.25}, \text{ Btu per (hr) (sq ft)} \quad \ldots\ldots (1)$$

where

Δt = temperature difference, Fahrenheit degrees, between the inner surface of the glass and the calorimeter air

The convection constant, 0.20, is considerably below that of 0.27 recommended by McAdams(2) for vertical flat surfaces. This constant was modified for positions other than vertical and for the direction of heat flow.

Heat lost through the calorimeter insulation was computed from the observed temperature drop across the insulation and the calibration constant appropriate to the temperatures involved. Heat loss through the edge was computed from the observed temperature drop across the edge heat meters and their calibration constant. Heat stored in the calorimeter shell during the course of a run was computed from the known weight of its component parts, their respective specific heats, and the observed rise in its average temperature.

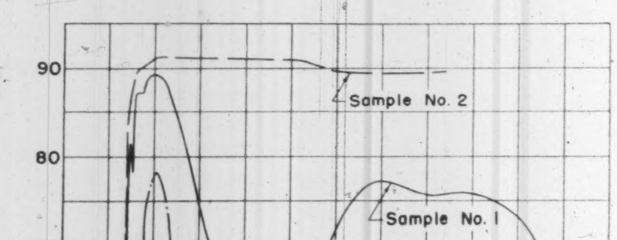

Fig. 4—Spectral transmittance curves of regular and heat absorbing glasses

Calculation of Incident Solar Radiation

The incident solar radiation was broken down as previously described into diffuse and direct radiation. The total radiation recorded on the potentiometer chart was integrated by means of a planimeter to obtain the mean value. The direct radiation was found by subtracting the mean observed diffuse radiation from the total incident radiation. Calibration constants for the Eppley pyrheliometer appropriate to the incident angle were then applied.

Spectral Transmittance Characteristics

The spectral transmittance curves of four glasses for which data are presented in this paper are shown in Fig. 4. This information was obtained by spectro-photometer tests of small samples taken from the same sheet from which the full sized samples were taken and was furnished by the companies which supplied the glass. Glasses No. 3 and No. 6 are commonly termed heat absorbing glasses. No. 3 was a rolled wire glass polished on both sides and was 0.29 in. thick. The other three were polished plate glasses of ¼ in. thickness. These four glasses were selected as covering the range normally found in practice. Some data on a double strength window glass, designated No. 9, and on a third heat absorbing glass, designated No. 10, are presented in this report.

Transmittance for Diffuse Solar Radiation

Although numerous calorimeter tests have been made to measure the transmittances of the various glasses for diffuse solar radiation, the variables involved are so numerous that the data require further analysis. Therefore, only the results of the tests made with the Eppley pyrheliometer will be presented in order to indicate trends. Tests consisted of from four to six sets of readings taken within a period of 15 min. Table 1, in which notations as to the sky conditions are given,

Table 1—Transmittance of Several Glasses for Diffuse Solar Energy (Sky Radiation) as Measured by the Eppley Pyrheliometer

Glass No.	Transmittance		Date	Sky Condition
	Range	Average		
1	0.69—0.71	0.70	2-21-47	Clear, slight haze
1	0.65—0.68	0.67	8-21-47	Very hazy
2	0.74—0.90	0.82	5-6-47	Partly cloudy
3	0.20—0.21	0.21	7-18-47	Hazy
6	0.37—0.38	0.37	7-21-47	Clear

shows these results. The calorimeter tests showed considerable variation for the same glass, but results were of the order of magnitude noted in Table 1.

Transmittance for Normally Incident Radiation

Many tests have been made of the transmittance for normally incident direct solar radiation of the several glass specimens. These tests were made with the Smithsonian Silver Disk pyrheliometer as described before and are being continued in order to discover whether or not there are systematic relationships between transmittance and atmospheric and solar conditions. For that reason a range of the values found is given. It cannot be stated at this time whether or not these values represent extremes. To date only glass No. 1 has been tested under a fairly wide range of conditions. Some values are compared (see Table 2) with the calculated transmittance based upon the spectral curves of Fig. 4 and the energy distribution for air mass of 2 according to Moon(3). No range has been given where a relatively small number of tests have been made.

Transmittance from Calorimeter Tests

From data taken in these tests the total solar heat transmitted by the glass was computed as previously described. From this value the direct or beamed radiation transmitted was found by subtracting the product of the incident diffuse radiation times the appropriate value given in Table 1. The result divided by the incident direct radiation gave the percent transmittance.

Table 2—Transmittance of Several Glasses for Normally Incident Direct Solar Radiation as Measured by the Smithsonian Silver Disk Pyrheliometer

Sample No.	Transmittance	
	Calculated	Measured
1	0.77	0.71—0.78
2	0.91	0.90—0.91
3	0.22	0.19—0.21
6	0.42	0.37—0.42
9		0.92
10		0.33—0.37

Fig. 5 shows the transmittance of glasses No. 1 and No. 2 *vs* angle of incidence (the angle between the sun's rays and a line perpendicular to the glass). The data for the former are for two clear days in April. Curve A is the theoretical transmittance(4) for glass No. 1 based upon a transmittance for normally incident radiation of 0.71. This value is an average of six measurements made in April with the Silver Disk pyrheliometer and is in reasonable agreement with the calorimeter test results. Correlation of a considerable amount of test data for glass No. 1 which were obtained during the winter of 1947 and which are not given at this time remains to be completed. A comparison of the data shown in Fig. 5 with that given by Curve A of Fig. 6, together with the values listed in Table 2, shows that solar energy distribution may be a more significant factor in transmittance of glass such as No. 1 than calculations have indicated.

Test data for glass No. 2 lie, on the average, slightly below the theoretical curve for glass with a transmittance of 0.90 for normally incident radiation. A theoretical curve for 0.89 transmittance would agree almost exactly with the test data. Inspection of Fig. 4 shows that, because of the flat spectral transmittance curve, solar energy distribution should have little or no effect on transmittance for the solar spectrum as a whole. It should be mentioned that points for 80 deg incident angle can be shifted up or down by relatively small differences in the value selected as the diffuse transmittance. This is so because the incident direct radiation at this angle is usually about equal to or less than the incident diffuse radiation.

Fig. 6 shows test data for sample No. 3, a heat absorbing polished wire glass. These data are from both fixed-angle and fixed position tests made during the latter part of July and the early part of August. Although there is some scattering, the points are in fair agreement with a theoretical curve based upon

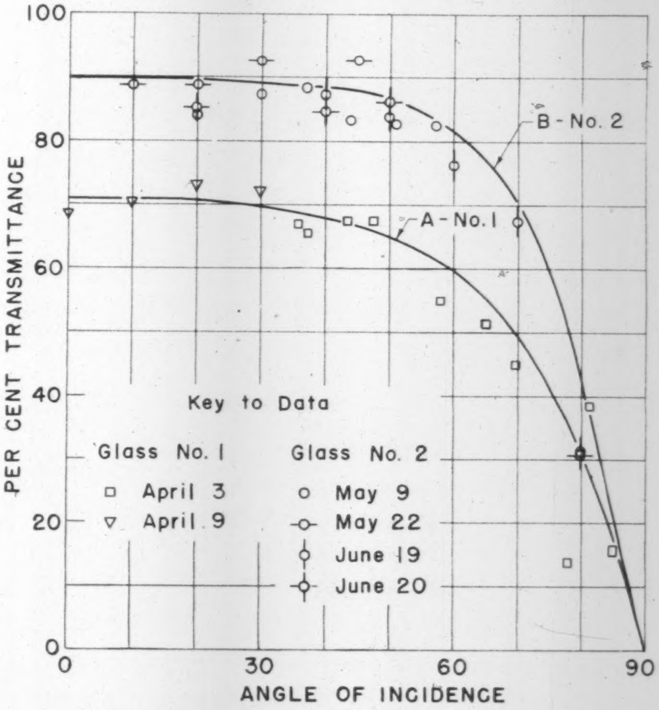

Fig. 5—Transmittance of glasses No. 1 and No. 2 for direct solar radiation

a transmittance of 0.20 for normally incident radiation.

The same figure shows data for glass No. 6, a heat absorbing plate glass, and the theoretical curve based upon 0.39 transmittance. The accuracy of these data was impaired because it was necessary to depend upon the readings of single couples in the inlet and outlet streams rather than the reading of the thermopile. The same comment applies to the test points for sample No. 1, which was retested late in August as a check on the Silver Disk tests. The latter rather consistently gave a normal incidence transmittance of about 0.76 upon which Curve A is based. In spite of some scattering the points are definitely higher than those obtained for the same glass during the spring.

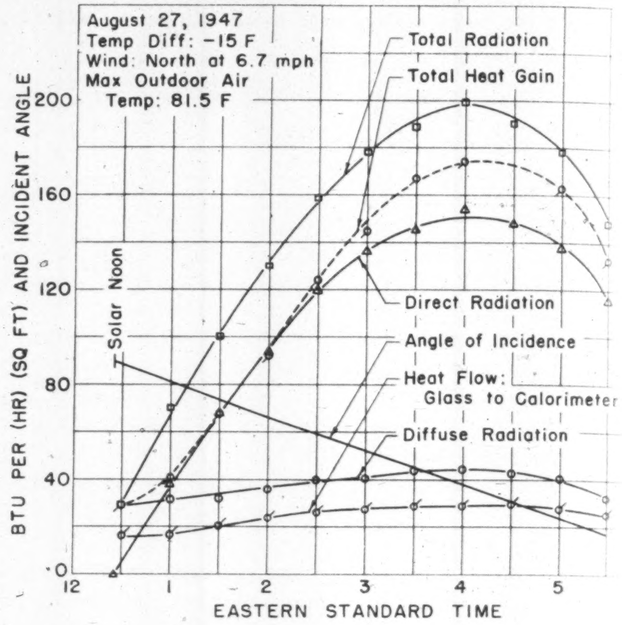

Fig. 7 — Test results for glass No. 1, oriented West

Total Heat Gain Through Glass

Besides a knowledge of the fractions of direct and diffuse radiation which pass through a given type of glass, it is of great practical importance to be able to account for the heat absorbed by the glass. Its passage to an air conditioned space is governed by convection conditions at the indoor and outdoor surfaces and radiation exchange between the glass and its indoor and outdoor surroundings. The latter includes not only the ground and neighboring buildings, but also the atmosphere itself which is a partial absorber of low temperature radiation.

Considerable information concerning some of these factors has been secured from the fixed angle tests. In order to extend this information and to approximate it for actual installations, a number of tests have been made in which the glass was held in a fixed position with an approximately fixed temperature difference between indoors, that is, the calorimeter, and outdoors. From all of these tests it is expected that a treatment can be developed which will account for the dissipation of solar heat absorbed by the glass as it is affected by the factors mentioned previously.

Because such a correlation has not been completed at this time, it will suffice in this progress report to demonstrate heat gain for two different types of glass. Fig. 7 shows the results for glass No. 1 facing west on a cloudless day. The wind was quite steady from the north and, on the average, parallel with the glass. The heat gain data have been corrected to a 15 deg difference between calorimeter and outdoor air temperature by arbitrarily adding or subtracting one Btu per (hr) (sq ft) for each degree departure from this difference. The calorimeter temperature was in each case below the outdoor air temperature. Based upon the heat flow from glass to calorimeter this correction was of the order of 25 percent or less. Based upon total heat gain, the correction was negligible. The heat flow from glass to calorimeter was computed by the procedure previously described. Fig. 8

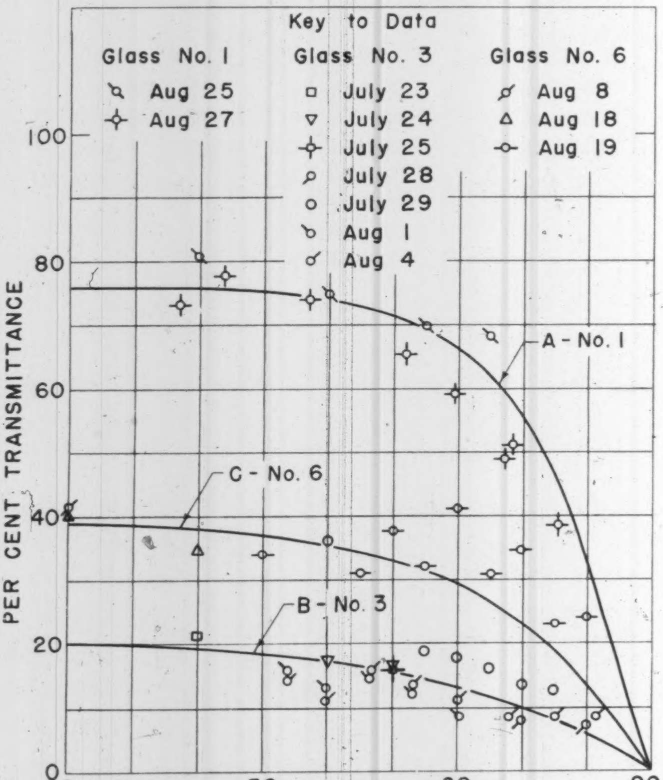

Fig. 6—Transmittance of glasses No. 1, No. 3 and No. 6 for direct solar radiation

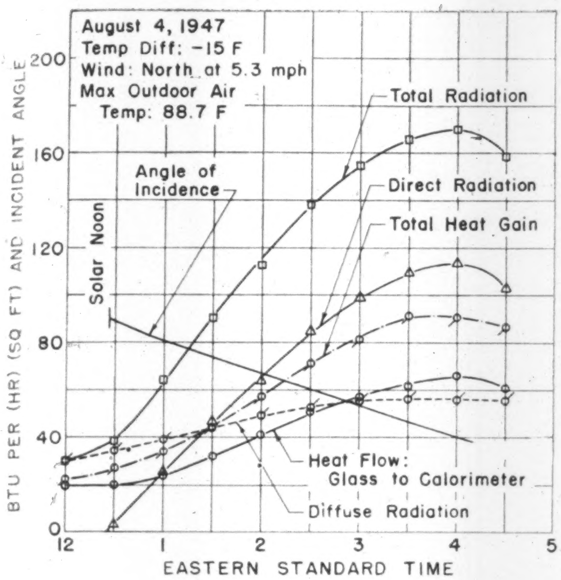

Fig. 8 — Test results for glass No. 3, oriented West

shows similar data for glass No. 3 with the same orientation, same temperature difference, and a somewhat lower wind velocity. The day was also cloudless, but the solar radiation was quite different in total intensity as well as in distribution between direct and diffuse. Quite different results were obtained for No. 3 on another day with a 5 deg greater differential, maximum air temperature of about 68 F, and radiation about the same as in Fig. 7.

Discussion of Results

Solar Energy Distribution

Data such as are presented in Figs. 5 and 6 are expected to have rather general application for the construction of design tables, once the dependence of total energy transmittance on solar energy distribution has been established. Table 2 shows that for glasses 1, 3, 6, and 10, the transmittance of each for normally incident radiation typical of the Cleveland area may differ by as much as 10 percent. The high transmittances of glasses 2 and 9 indicate that reflection accounts for the principal loss. Therefore they should be little affected by solar energy distribution changes.

The primary factors which alter the distribution of energy in the solar spectrum are atmospheric water vapor, dust, and solar altitude (air mass). A fourth factor, haze, is a combination of the first two, dust particles forming nuclei for the condensation of water vapor. The result is a whitish cast to the sky and a scattering of solar energy in excess of that due to the molecules of air and water vapor that constitute the atmosphere and to suspended dust. Ozone is a strong absorber in the ultraviolet region, but since this portion of the spectrum accounts for only a small percentage of the total energy at earth level, it probably can be disregarded as a factor of importance in solar heat gain through glass.

Moon(3) has computed atmospheric transmission for a definite amount of water vapor and dust. The results of his computations as to the total energy in the solar spectrum are summarized in Curve B of Fig. 9. Markedly different from Curve B are the two curves shown for Cleveland. These are illustrative of the effects of atmospheric conditions. Fig. 10 shows Moon's computed energy distribution for air mass zero and air mass 2.

The computed total energy transmittance of a glass with a spectral curve similar to that of No. 1 has been found to be practically identical for Moon's computed energy distributions corresponding to air masses 1, 2, and 3. Similar computations for a heat absorbing glass with a total energy transmittance of about 50 percent differed by about 5 percent. Although considerable differences in energy distribution must exist between the curve based upon Moon's calculations and those shown for Cleveland, it is not now apparent how it can be great

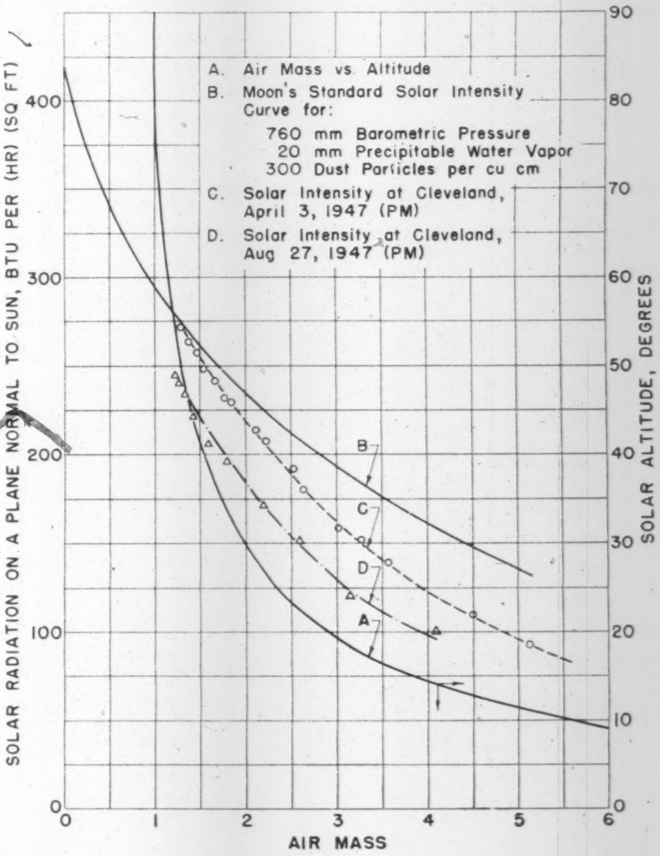

Fig. 9—Intensity of direct solar radiation on clear days at Cleveland

enough to account for the range shown in Table 2 for glass No. 1.

The data given in Table 1 when compared with those given in Table 2 indicate that the energy distribution in the spectrum of diffuse radiation is considerably different from that in the sun's spectrum. If both were identical, the transmittance for diffuse radiation would be less than for normally incident direct radiation, because the diffuse radiation, in effect, comes in from an angle of about 60 deg. The results for glass No. 2, one unaffected by energy distribution, follow this pattern. The results for the heat absorbing glasses are what might be expected. The diffuse radiation is radiation from the sun that is scattered by the air molecules and, since the infrared is scattered but little, the diffuse spectrum is strong in the visible region in which also the transmittance of a heat absorbing glass is high.

In view of the lack of data concerning energy distribution, a full explanation of the results shown in Tables 1 and 2 and in Figs. 5 and 6 awaits a more exhaustive study and analysis.

Total Heat Gain

The data presented in Figs. 7 and 8 are not intended to represent design data, but are simply heat gain data for the conditions stated. Because the atmospheric conditions were different on the two test days, they do not show the true difference between greatly different types of glass.

During the course of the tests it has been found that, besides the solar intensity, wind velocity, and air temperature, other factors need to be considered to account for the heat transmitted by or conducted through the glass. Among these are solar radiation reflected from the ground or nearby buildings, low temperature radiation exchange between these surroundings and the glass, and radiation exchange between the glass and the atmosphere. The latter, usually known as nocturnal radiation, has appeared as a significant factor on those occasions when radiation exchange with the ground objects was not a factor.

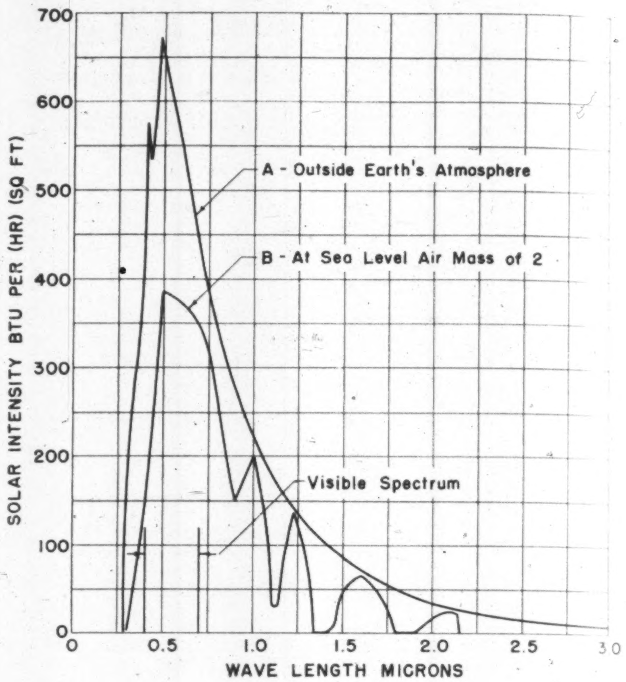

Fig. 10—Spectral energy distribution of the direct rays of the Sun on a plane normal to the rays

Summary

The transmittance for direct and diffuse radiation of several types of glass has been experimentally determined by two different methods. The results have been compared with theoretical curves and show similar trends. Pyrheliometric tests show, for certain glasses, differences in transmittance for normal incident radiation of as much as 10 percent. These differences are significant because they are believed to be due to atmospheric conditions that alter the energy distribution of the solar spectrum. These findings indicate the need for further research in this area in order that design data can be developed for atmospheric conditions typical of various localities throughout the country.

Examples of total heat gain for two types of glass have been given to illustrate the distinction between heat gain by transmittance of the incident radiation and heat gain by way of radiation and convection from glass which is warmed by the sun.

Because a considerable body of test data remain to be correlated, and because the problem of solar heat gain through glass is as yet incompletely understood, some of the results presented here are subject to modification or to different interpretation as time goes on.

Acknowledgment

The authors acknowledge with thanks the assistance and counsel given by their colleagues of the ASHVE Research Laboratory staff during the course of the work described in this report. In particular they wish to thank:

1. The Aluminum Co. of America, New Kensington, Pa., who fabricated the calorimeter.
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3. The members of the Technical Advisory Committee on Glass for suggestions, advice, and technical information.

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A New Method for Selecting Winter Design Temperatures

By Clark M. Humphreys*, Cleveland, Ohio

Introduction

The first step in the design of any heating system is the calculation of heat losses for the building. To a large extent the first cost, the operating cost and general satisfaction of the system for years to come will be determined by these calculations.

The accuracy of heat loss estimates depends upon the accuracy of the several factors used in their calculation. These factors include the transmission coefficients for the various parts of the structure, infiltration values, and the difference between outside and inside design temperatures.

The ASHVE Transactions give evidence that the importance of accuracy in heat loss calculations has long been recognized. A recent survey indicates that in the 29 volumes from 1916 to 1944 there were at least 74 papers on the general subject. A closer examination, however, shows that at least one phase of the subject has been badly neglected by researchers. Of the 74 papers, 50 pertain to heat transfer through building materials, 22 refer to the subject of infiltration, and only 2 deal with winter design temperatures.

SUMMARY — The author suggests that outside design temperature be defined as the lowest daily mean temperature which is likely to recur frequently enough during the average winter to justify consideration. A study of temperatures for 120 cities as obtained from the U.S. Weather Bureau and covering 23 consecutive heating seasons from November 1914 to March 1937 is used as a basis for obtaining the recommended design temperatures. It is suggested that present inside as well as outside design temperatures are too low and also that they should vary with type of construction, thermal capacity and type of occupancy.

The data contained in the ASHVE Guide are amended in successive issues to keep abreast of progress. It shows that little change has occurred for a number of years in practical knowledge of design temperatures. The 1923 issue contained a table of weather data almost identical in form to that in the latest edition. A recommendation was included in the 1924-25 issue that the design temperature, "should be not more than 15 deg above the lowest temperature on record during the last 10 years." This rule was retained up to and including the 1943 edition. The last four issues contain the recommendation that, "a temperature somewhat higher than the minimum or the lowest daily mean on record," be used for design purposes. Then, in contrast to this rule, a map of design temperatures is included indicating design temperatures which, for a few localities, are actually lower than the lowest temperature on record.

Perhaps the most effective way of illustrating the shortcomings of one old rule of thumb which specifies a design temperature of *15 F above the lowest temperature on record during the last 10 years*, is to try to apply it literally. Under this rule the design temperature for Pittsburgh, Pa., would have changed four times during the period from 1926 to 1937, and would have varied from + 11 F to —1 F. These circumstances are cited to emphasize the need for more knowledge and further consideration of design temperatures.

Influence of Various Errors

To be consistent, the several factors used in the calculation of heat losses should be selected with an accuracy proportional to their relative effects upon the final results. With this principle in mind, the importance of design temperatures can be readily illustrated.

In Table 7 of Chapter 14 in The Guide 1947, the heat losses from the various elements of an insulated house are shown to comprise approximately the following percentages of the total loss:

Walls	Ceiling	Glass	Infiltration
Percent			
36	16	37	11

An error of 10 percent in the transmission coefficient for the walls, ceiling, or glass, or in the infiltration value would result in errors of

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For presentation at the 54th Annual Meeting of the American Society of Heating and Ventilating Engineers, New York, N. Y., February 1948.

Table 1—Average Number of Times Per Year During the Period Studied That the Daily Minimum and Daily Mean Temperatures Have Been As Low As or Lower Than the Temperatures Indicated

Station	Average Frequency of Recurrence													
	Once in 3 years		Once in 2 years		Per Year									
					Once		Twice		3 Times		4 Times		5 Times	
	Temperatures													
	Min.	Mean	Min.	Mean	Min.	Mean	Min.	Mean	Min.	Mean	Min.	Mean	Min.	Mean
ALABAMA														
Birmingham	7	16	8	18	11	21	15	25	17	26	19	28	20	29
Mobile	18	27	19	28	22	30	24	33	27	35	28	36	29	38
ARIZONA														
Flagstaff	-18	2	-17	3	-14	6	-11	8	-8	10	-6	12	-5	13
Phoenix	24	38	25	39	26	40	27	41	28	42	29	43	29	43
Yuma	29	39	29	40	30	42	31	44	32	45	33	46	33	46
ARKANSAS														
Fort Smith	-3	9	1	12	5	15	9	18	12	21	14	22	15	23
Little Rock	5	13	6	15	9	18	12	20	14	22	16	23	18	25
CALIFORNIA														
Eureka	25	33	27	34	28	36	29	37	31	38	31	39	32	39
Fresno	24	32	25	33	27	35	28	36	29	37	29	38	30	38
Los Angeles	35	42	36	42	37	43	38	45	39	46	40	47	40	47
San Francisco	33	38	34	39	35	40	36	41	37	42	38	43	39	44
COLORADO														
Denver	-16	-7	-14	-6	-11	-3	-8	1	-5	5	-3	7	-1	9
Durango	-19	0	-18	1	-15	3	-12	6	-10	8	-8	9	-7	10
Grand Junction	-17	-1	-16	0	-12	2	-9	4	-6	7	-4	9	-2	10
Trinidad[a]	-18	-2	-16	1	-9	4	-5	9	-3	11	-1	13	0	15
CONNECTICUT														
New Haven	-8	1	-6	3	-3	7	1	10	3	12	5	13	6	14
FLORIDA														
Jacksonville	21	30	22	32	25	35	28	37	30	39	31	40	32	41
Tampa	28	40	30	40	33	43	35	45	36	46	37	47	38	48
GEORGIA														
Atlanta	5	15	6	16	11	20	14	23	16	26	18	27	19	27
Savannah	18	26	20	28	22	32	25	35	27	36	28	37	29	38
IDAHO														
Lewiston	-15	-4	-13	-3	-10	0	-5	4	0	8	3	11	5	12
Pocatello	-20	-9	-18	-8	-16	-6	-11	-1	-8	3	-6	5	-4	7
ILLINOIS														
Cairo	-4	4	-2	5	1	9	4	12	7	14	9	16	10	18
Chicago	-14	-6	-13	-5	-9	-1	-6	1	-5	3	-3	5	-2	6
Springfield	-15	-5	-13	-3	-8	0	-5	3	-3	5	-2	6	0	8
INDIANA														
Evansville	-7	1	-5	3	-1	6	2	10	4	12	6	14	7	15
Fort Wayne	-14	-2	-12	-1	-8	1	-6	3	-5	5	-3	6	-1	7
Indianapolis	-11	-2	-10	-1	-8	2	-4	5	-3	7	-1	8	0	10
IOWA														
Dubuque	-24	-11	-22	-10	-18	-8	-15	-5	-13	-3	-10	-2	-9	-1
Keokuk	-18	-8	-17	-7	-13	-3	-9	0	-7	2	-5	4	-4	5
Sioux City	-24	-16	-23	-15	-20	-11	-16	-8	-14	-6	-12	-3	-11	-3
KANSAS														
Concordia	-15	-6	-14	-5	-10	-2	-8	2	-5	3	-3	5	-2	6
Dodge City	-12	-3	-11	-2	-9	1	-6	5	-4	7	-1	9	0	10
Goodland	-17	-9	-16	-7	-14	-3	-10	1	-7	4	-6	6	-5	8
Wichita	-10	-1	-8	0	-6	3	-2	6	1	9	2	11	3	12
KENTUCKY														
Lexington	-8	1	-6	2	-4	5	0	8	2	10	4	13	6	15
LOUISIANA														
New Orleans	22	28	23	30	26	33	29	36	31	37	32	39	33	40
Shreveport	11	21	13	22	16	25	19	26	21	28	23	30	24	31
MAINE														
Eastport	-17	-10	-16	-7	-12	-4	-10	0	-7	1	-6	3	-5	4
Portland	-14	-5	-12	-3	-9	1	-6	3	-4	5	-2	6	-1	8
Van Buren[b]	-42	-23	-41	-22	-37	-19	-34	-15	-32	-13	-30	-11	-28	-10
MARYLAND														
Baltimore	2	10	4	11	6	14	9	16	10	18	12	19	13	20
Cumberland	-6	6	-5	7	-2	10	1	12	4	14	5	15	6	17
MASSACHUSETTS														
Boston	-10	0	-7	2	-3	5	0	9	2	11	3	12	4	14
MICHIGAN														
Alpena	-18	-8	-17	-6	-13	-4	-10	-1	-9	1	-8	2	-7	3
Detroit	-10	-1	-9	0	-5	2	-3	5	-1	6	0	8	1	9
Grand Rapids	-11	-1	-10	0	-7	2	-2	5	-1	7	0	8	1	9
Marquette	-18	-10	-17	-9	-14	-6	-12	-4	-10	-2	-9	-1	-8	0
MINNESOTA														
Duluth	-33	-23	-32	-22	-29	-20	-26	-16	-25	-14	-23	-13	-22	-12
Minneapolis	-27	-19	-25	-18	-23	-15	-20	-12	-18	-10	-17	-8	-16	-7
Moorhead	-35	-25	-32	-24	-31	-22	-28	-18	-26	-16	-24	-15	-23	-14
MISSISSIPPI														
Vicksburg	11	20	13	22	16	24	20	27	21	29	23	31	24	32
MISSOURI														
St. Joseph	-16	-7	-15	-6	-12	-3	-9	0	-6	2	-4	4	-2	6
St. Louis	-10	-1	-8	1	-3	4	0	8	2	10	3	11	5	13
Springfield	-11	-1	-9	0	-5	4	-1	8	1	11	3	12	5	13
MONTANA														
Billings	-36	-23	-34	-22	-31	-19	-26	-14	-22	-11	-20	-9	-18	-7
Havre	-42	-31	-39	-29	-36	-26	-33	-23	-30	-20	-28	-17	-26	-15
Helena	-32	-25	-31	-24	-29	-21	-25	-17	-22	-13	-20	-11	-17	-8
Kalispell	-26	-16	-25	-16	-22	-13	-18	-10	-16	-7	-13	-5	-11	-3
NEBRASKA														
Lincoln	-20	-10	-18	-9	-16	-6	-13	-3	-10	-1	-9	0	-7	1
North Platte	-22	-12	-21	-10	-18	-8	-15	-4	-12	-2	-11	0	-10	1
NEVADA														
Logandale	14	28	14	29	16	31	19	32	20	34	21	35	21	36
Reno	-10	5	-7	7	-3	9	0	13	2	15	5	17	7	18
Searchlight[a]	14	22	15	23	17	25	20	28	22	30	23	31	24	32
Tonopah	-5	2	-4	4	2	9	4	11	7	13	8	14	9	15
Winnemucca	-25	-8	-24	-6	-19	-1	-13	4	-8	8	-6	10	-5	11
NEW HAMPSHIRE														
Concord	-20	-8	-18	-6	-16	-1	-12	1	-10	3	-8	5	-7	6
NEW JERSEY														
Atlantic City	0	9	1	10	4	13	7	16	9	18	11	19	12	20
NEW MEXICO														
Roswell	-4	9	-2	10	2	14	6	18	9	20	10	22	12	23
Santa Fe	-3	7	-2	9	0	11	2	13	4	15	5	16	6	17
NEW YORK														
Albany[a]	-18	-9	-16	-7	-12	-2	-8	2	-6	4	-4	6	-3	7
Buffalo[a]	-8	-3	-7	-1	-5	3	-2	5	-1	7	0	8	2	9
New York[a]	-6	4	-3	6	0	10	4	12	6	14	7	15	8	17
NORTH CAROLINA														
Asheville	-2	9	-1	10	3	11	7	17	9	19	11	21	12	22
Raleigh	8	16	8	18	11	20	14	23	15	24	17	25	18	26
Wilmington	12	21	13	23	16	25	19	28	21	30	23	31	24	32
NORTH DAKOTA														
Bismarck	-39	-27	-37	-25	-33	-22	-29	-20	-27	-17	-26	-16	-25	-14
Devil's Lake	-40	-30	-38	-29	-35	-26	-32	-23	-30	-21	-28	-20	-27	-19
Williston	-39	-29	-37	-27	-34	-24	-31	-22	-29	-20	-27	-19	-26	-18
OHIO														
Cincinnati	-10	0	-9	1	-5	3	-2	6	0	9	2	11	3	12
Cleveland	-7	1	-6	2	-4	4	-1	7	0	8	2	9	3	10
Columbus	-9	0	-9	0	-7	3	-2	6	0	8	1	10	3	11
OKLAHOMA														
Oklahoma City	-4	4	-2	5	1	8	4	12	7	15	9	16	10	18
OREGON														
Baker	-21	-8	-19	-7	-15	-3	-11	1	-8	4	-5	6	-4	7
Medford	3	15	6	16	9	20	13	24	15	26	17	27	18	28
Portland	11	15	12	16	14	19	16	21	18	22	19	24	21	25
PENNSYLVANIA														
Philadelphia	1	9	2	10	4	12	8	15	10	17	11	18	12	19
Pittsburgh	-7	1	-6	2	-4	4	-1	7	1	9	3	11	5	12
Scranton	-9	0	-7	3	-5	5	-1	8	1	9	2	10	3	11
Somerset[a]	-20	-4	-17	-3	-14	0	-10	3	-8	6	-6	8	-4	9
RHODE ISLAND														
Providence	-8	0	-6	2	-2	6	0	9	3	11	4	12	5	13
SOUTH CAROLINA														
Charleston	17	23	18	25	22	29	25	33	27	34	28	35	29	36
Columbia	12	21	13	22	16	26	19	28	21	30	22	31	24	32
SOUTH DAKOTA														
Huron	-31	-21	-29	-19	-26	-16	-23	-14	-22	-12	-20	-10	-18	-9
Rapid City	-28	-19	-27	-18	-24	-15	-21	-12	-18	-9	-17	-7	-15	-6
TENNESSEE														
Knoxville	2	9	3	11	6	14	9	19	12	21	14	23	15	24
Memphis	5	11	6	12	8	15	11	18	14	20	15	22	16	23
TEXAS														
Amarillo	-5	4	-4	5	-2	7	1	13	4	15	6	17	8	18
Brownsville	25	32	26	35	30	37	31	39	33	40	34	42	35	43
El Paso	14	25	16	25	18	27	19	30	21	32	22	33	23	34
Fort Worth	7	16	10	18	12	21	15	23	17	26	18	27	19	28
San Antonio	17	22	18	25	21	29	24	32	25	34	26	35	27	36
UTAH														
Modena	-23	-9	-22	-6	-17	-2	-13	2	-11	5	-9	6	-7	9
Salt Lake City	-8	1	-6	2	-2	7	3	12	5	14	7	15	8	16
VERMONT														
Burlington	-25	-17	-23	-13	-19	-8	-16	-6	-14	-3	-12	-2	-11	-1
VIRGINIA														
Lynchburg	0	13	2	14	4	15	8	18	9	20	11	22	13	23
Norfolk	9	16	10	17	13	20	16	22	17	24	19	26	20	27
Wytheville	-5	5	-4	6	-1	9	2	12	5	14	6	16	8	17
WASHINGTON														
Seattle	14	19	15	20	17	23	19	24	21	26	23	28	24	29
Spokane	-15	-3	-13	-2	-9	0	-7	2	-4	5	-1	7	3	9
Yakima	-14	-1	-11	1	-8	3	-4	5	0	7	1	10	3	11
WEST VIRGINIA														
Elkins	-14	0	-11	1	-8	3	-5	6	-3	8	-1	10	1	12
Parkersburg	-9	3	-7	4	-3	6	0	9	2	12	4	13	5	15
WISCONSIN														
Green Bay	-24	-13	-23	-12	-20	-10	-17	-8	-15	-6	-14	-4	-12	-3
LaCrosse	-27	-16	-26	-15	-24	-12	-21	-9	-18	-7	-16	-6	-15	-5
Milwaukee	-18	-10	-16	-9	-14	-5	-11	-3	-9	-1	-7	0	-6	2
WYOMING														
Encampment[a]	-30	-12	-26	-11	-22	-6	-17	-1	-14	1	-12	4	-10	5
Lander	-36	-22	-34	-20	-27	-16	-23	-12	-21	-9	-19	-7	-18	-5
Sheridan	-35	-22	-33	-21	-29	-19	-25	-14	-23	-11	-21	-9	-19	-7
Yellowstone Park	-34	-24	-33	-22	-29	-18	-25	-13	-20	-9	-18	-6	-16	-4

[a] 22 year period

[b] 19 year period

3.6, 1.6, 3.7, or 1.1 percent, respectively, in the final results. An error of 10 percent in temperature difference would change the final results by 10 percent.

The outside design temperature is too important a factor to be determined by any rule of thumb on the basis of one cold day. Instead, it should be so selected that it will indicate with a fair degree of accuracy, the lowest temperature which is likely to prevail long enough or occur frequently enough in an average winter to justify consideration.

ASHVE Technical Advisory Committee Recommendation

The Technical Advisory Committee on Weather Design Conditions has proposed such a basis of selection, and has defined the winter design temperature as that hourly temperature which prevails or is exceeded in not more than 97½ percent of the hours during the four coldest winter months. Not satisfied with just a definition, the Committee has initiated an analysis of weather data which will provide both summer and winter design data for 117 cities throughout the country, and early completion of the work is dependent upon the availability of funds.

While an analysis of this type promises to yield dependable data, the enormous amount of work required makes it unlikely that design data based on this method of analysis can be made available for any but the largest centers of population for many years to come. At the present time the data necessary for such a survey are available for only a limited number of stations and for a limited period of time. The present study has been made possible only by the fact that most of the work was done by WPA.

Another logical and less laborious method of design temperature selection is urgently needed. Without it, even after the previously mentioned analysis is completed, heating design in hundreds of communities will continue to be based on some unreliable rule of thumb. This need for an easier method of selection points to another important application of the more exact analysis. These results should serve as an excellent yardstick for judging the merits of any shorter method of selection which may be proposed, or as a useful tool in the development of such a method.

Simpler Method Proposed

As a first suggestion for a simplification of the Committee's method of analysis, it is proposed that winter design temperatures be selected on the basis of probable frequency of recurrence of *low daily mean* temperatures. The winter design temperature could be defined as the *lowest daily mean temperature which is likely to recur frequently enough during the average winter to justify consideration.* A discussion of the frequencies to be used is given later.

In 1938 the author, assisted by workers furnished by WPA, made a survey of winter weather data for 120 cities throughout the country. United States Weather Bureau records[1] for 23 consecutive heating seasons from November, 1914, to March, 1937, were studied. Both *daily minimum* and *daily mean* temperatures were analyzed, and the *frequency of occurrence of both were tabulated.* The results were originally published as Carnegie Institute of Technology Bulletin No. 82[2]. The tabular data which appear in this paper are reproduced from this bulletin.

Table 1 gives the average frequency of recurrence of daily mean and daily minimum temperatures for 120 cities. Values given are cumulative, and include all of the occurrences of temperatures as low as or lower than the value indicated. Wherever the frequency of occurrence of daily mean or daily minimum temperature is mentioned in this paper, *this cumulative meaning is intended.*

Table 2 gives the maximum number of recurrences of daily mean and daily minimum temperatures in any one heating season in the 23 year period studied. This table was prepared by combining and rearranging some of the original data, and some of the values given in it are interpolated. In using this table, one should remember that it presents a record of the coldest winter in a 23 year period.

As an example of the use of these tables, it is found from Table 1 that in Cleveland, Ohio, a daily minimum temperature of —1 or lower and a daily mean temperature of +7 or lower may be expected to occur with an average frequency of twice per year. Table 2 indicates that a daily minimum temperature of —1 or lower has occurred as many as 12 times during a single heating season, while a daily mean temperature of +7 or lower has occurred a maximum of 14 times per season.

The probable frequencies of recurrence of both daily minimum and daily mean temperatures have been included in the tabulations because both are of interest in selecting design temperatures. The daily mean temperature, however, is much more indicative of actual heating load, and therefore, should be a more logical basis for the selection of design temperatures.

It is difficult to justify the common practice of using the same design temperature for all buildings in a given locality. Actually, the proper design temperature might be expected to vary with type of construction and with occupancy. The high thermal capacity of most structures makes it unnecessary to consider low temperatures of short duration. It therefore follows that heating systems for structures having very low thermal capacity or very high infiltration rates should be designed for a lower temperature, or for a mean temperature having a lower probable frequency of recurrence. A greenhouse might be a good example of this type of structure.

The seriousness of occasional slight underheating varies with the type of occupancy, and this factor should be considered in selecting the design temperature. A hospital,

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[1] Climatological Data for the United States by Sections.

[2] An Analysis of Winter Temperatures for One Hundred and Twenty Cities, by Clark M. Humphreys.

Table 2—Maximum Number of Times in Any One Heating Season That the Daily Minimum and Daily Mean Temperatures Have Been As Low As or Lower Than the Values Indicated

Station	Maximum No. of Occurrences Per Year													
	2		4		6		8		10		12		14	
	Min.	Mean	Min.	Mean	Min.	Mean	Min.	Mean	Min.	Mean	Min.	Mean	Min.	Mean
ALABAMA														
Birmingham	6	16	8	21	13	24	15	25	16	26	18	27	19	—
Mobile	18	27	21	30	22	31	26	32	—	35	—	37	—	—
ARIZONA														
Flagstaff	−20	1	−15	5	−13	8	−11	10	−10	—	−7	—	—	—
Phoenix	24	37	26	39	27	40	28	41	—	42	—	—	—	—
Yuma	28	37	30	38	31	40	32	42	33	43	—	44	—	45
ARKANSAS														
Fort Smith	−8	6	−2	12	3	14	7	15	8	16	9	17	10	18
Little Rock	1	11	6	14	8	15	9	16	10	18	12	19	13	19
CALIFORNIA														
Eureka	24	32	27	34	28	36	29	37	30	38	31	39	32	39
Fresno	—	—	—	—	26	34	28	36	29	36	30	37	31	38
Los Angeles	—	41	—	42	36	44	37	45	38	46	39	46	40	47
San Francisco	—	—	32	38	34	40	36	42	37	43	37	43	38	43
COLORADO														
Denver	−17	−10	−14	−7	−12	−4	−10	4	−5	7	—	—	—	—
Durango	−19	−2	−16	4	−13	6	−10	9	—	—	—	—	—	—
Grand Junction	−18	−4	−16	−1	−13	1	−11	2	−8	4	−7	6	−6	8
Trinidad	−19	−9	−13	6	−5	8	−1	10	—	12	—	13	—	—
CONNECTICUT														
New Haven	−10	−2	−8	0	−4	5	−3	7	−2	10	2	11	4	11
FLORIDA														
Jacksonville	21	29	23	34	28	37	30	39	31	41	—	—	—	—
Tampa	28	39	32	42	34	44	36	46	37	—	38	—	39	—
GEORGIA														
Atlanta	5	14	10	19	11	22	14	24	16	25	17	27	—	—
Savannah	16	25	20	29	24	32	25	34	26	35	27	37	28	—
IDAHO														
Lewiston	−18	−7	−14	−4	−12	−3	−9	1	0	6	—	9	—	—
Pocatello	−21	—	−18	−8	−16	−6	−13	−4	−8	3	−7	5	−6	—
ILLINOIS														
Cairo	−7	4	−3	6	0	8	2	10	3	11	4	12	6	13
Chicago	−16	—	−14	−6	−10	−4	−8	−2	−7	0	−7	2	−6	3
Springfield	−16	−4	−10	−2	−8	0	−7	1	−6	2	−5	4	−4	5
INDIANA														
Evansville	—	—	−6	2	−3	6	−1	7	0	9	2	10	3	11
Fort Wayne	—	−2	−12	0	−10	2	−8	3	−6	4	−5	4	−5	5
Indianapolis	—	−2	−10	0	−9	2	−7	3	−6	4	−5	6	−4	7
IOWA														
Dubuque	−24	—	−19	−10	−17	−9	−16	−7	−14	−6	−13	−4	−12	−3
Keokuk	−18	−7	−14	−5	−12	−3	−11	−2	−10	−1	−9	0	−8	0
Sioux City	−26	−17	−22	−14	−21	−10	−18	−9	−17	−9	−16	−8	−15	−7
KANSAS														
Concordia	−15	−6	−12	−2	−10	0	−9	1	−7	2	−5	3	−3	4
Dodge City	−12	−3	−10	0	−8	4	−6	6	−4	7	−3	8	−1	—
Goodland	−20	—	−16	−5	−12	0	−7	4	—	7	—	—	—	—
Wichita	−10	−2	−6	2	−5	4	−4	6	−2	8	0	9	1	9
KENTUCKY														
Lexington	−14	−2	−8	2	−6	4	−4	7	−1	9	1	10	3	11
LOUISIANA														
New Orleans	21	28	24	32	28	33	29	35	30	37	32	39	33	—
Shreveport	9	18	13	22	15	24	18	25	20	26	21	28	23	—
MAINE														
Eastport	−23	−12	−16	−6	−12	−4	−10	−2	−8	0	—	2	—	—
Portland	−18	−8	−11	−3	−8	0	−6	2	−4	3	—	4	—	6
Van Buren	−42	−24	−38	−22	−36	−19	−34	−16	−33	−15	−32	−14	−30	−13
MARYLAND														
Baltimore	0	6	2	8	4	11	6	13	8	16	10	17	11	18
Cumberland	−7	—	−4	7	−2	10	0	11	2	11	4	12	—	14
MASSACHUSETTS														
Boston	−15	−3	−9	2	−3	6	0	9	1	10	2	11	—	12
MICHIGAN														
Alpena	−23	−10	−16	−7	−14	−5	−12	−3	−11	−2	−10	−1	−9	0
Detroit	−14	−2	−6	1	−4	2	−3	3	−2	4	−2	6	−1	—
Grand Rapids	−13	−3	−9	0	−8	−2	−6	3	−4	4	−2	5	−1	6
Marquette	−18	−8	−16	−6	−12	−5	−10	−3	—	−1	—	—	—	—
MINNESOTA														
Duluth	−32	−25	−31	−20	−29	−19	−28	−17	−24	−15	−23	−12	−22	−11
Minneapolis	−28	−21	−26	−18	−22	−16	−21	−13	−20	−11	−18	−9	—	—
Moorhead	−36	−27	−33	−25	−31	−24	−30	−21	−28	−19	−27	−18	−25	−16
MISSISSIPPI														
Vicksburg	10	20	13	23	15	25	17	26	19	27	20	28	21	29
MISSOURI														
St. Joseph	−17	−7	−13	−4	−12	−2	−11	−1	−10	0	−10	1	−9	1
St. Louis	−12	—	−7	1	−5	4	−4	5	−3	6	−2	8	−1	9
Springfield	−15	−2	−7	2	−5	5	−3	7	0	8	2	9	—	11
MONTANA														
Billings	−36	−25	−31	−22	−28	−18	−25	−16	−22	−14	—	−11	—	—
Havre	−53	−44	−42	−32	−38	−30	−36	−22	−32	−21	−30	−19	—	—
Helena	−35	−26	−30	−24	−28	−22	−24	−19	−22	−14	—	—	—	—
Kalispell	−26	−16	−24	−14	−22	−12	−18	−9	−17	−6	−16	—	—	—
NEBRASKA														
Lincoln	−20	−12	−17	−9	−16	−7	−15	−6	−14	−4	−13	−3	−12	−2
North Platte	−22	−12	−20	−9	−18	−7	−16	−4	−15	−3	−14	−2	−12	—
NEVADA														
Logandale	—	25	14	28	15	30	16	32	18	33	20	34	21	34
Reno	−15	3	−12	8	−6	10	−2	12	−1	14	0	16	2	17
Searchlight	12	22	14	24	17	26	19	28	20	29	22	30	—	31
Tonopah	−8	0	−4	2	2	6	5	10	7	12	8	13	9	14
Winnemucca	−28	−10	−24	−8	−22	−6	−18	1	−14	4	−11	6	−9	8
NEW HAMPSHIRE														
Concord	—	−10	−20	−5	−17	−2	−14	−1	−12	0	−11	1	−10	2
NEW JERSEY														
Atlantic City	−3	3	−1	7	1	9	3	12	5	16	8	17	9	18
NEW MEXICO														
Roswell	—	7	−4	11	1	16	5	18	7	20	9	22	10	23
Santa Fe	−3	7	0	10	1	13	3	15	4	17	—	—	—	—
NEW YORK														
Albany	−20	−10	−15	−7	−11	−4	−10	−2	−9	1	−7	4	−5	—
Buffalo	−8	−2	−6	0	−5	1	−5	2	−4	4	−1	6	1	7
New York	—	−2	−6	2	−2	5	0	9	2	12	5	14	7	15
NORTH CAROLINA														
Asheville	—	9	0	12	4	15	7	18	8	19	9	19	10	20
Raleigh	7	15	8	18	10	19	12	19	13	20	14	21	15	22
Wilmington	—	—	11	21	15	23	20	26	21	28	22	29	23	30
NORTH DAKOTA														
Bismarck	−39	−29	−34	−25	−30	−23	−29	−22	−28	−20	−27	−18	−26	−17
Devil's Lake	—	—	−40	−31	−38	−29	−36	−25	−34	−23	−32	−22	−30	−20
Williston	−40	−31	−35	−27	−33	−24	−31	−23	−30	−22	−28	−20	−26	−18
OHIO														
Cincinnati	−13	−2	−10	0	−8	2	−6	4	−4	5	−3	6	−2	7
Cleveland	−8	1	−6	3	−4	4	−2	5	−1	6	−1	7	0	7
Columbus	−12	−2	−10	0	−8	1	−9	2	−5	4	−2	6	−1	7
OKLAHOMA														
Oklahoma City	−5	4	−3	5	0	7	3	11	5	13	6	14	7	15
OREGON														
Baker	—	—	−20	−6	−13	−1	−11	1	−10	3	−8	4	—	5
Medford	5	15	7	17	11	20	13	22	14	24	15	26	16	27
Portland	9	13	12	16	15	20	16	21	17	21	18	22	—	—
PENNSYLVANIA														
Philadelphia	−1	—	1	8	3	10	5	12	8	16	9	17	10	17
Pittsburgh	−13	—	−9	1	−6	3	−4	5	−3	6	−2	7	1	8
Scranton	−11	−4	−8	1	−6	3	−4	5	−2	7	−1	8	0	9
Somerset	—	−5	−19	−3	−15	0	−12	2	−10	4	−9	5	−8	6
RHODE ISLAND														
Providence	−11	−1	−7	2	−4	5	−2	8	0	10	3	11	—	12
SOUTH CAROLINA														
Charleston	—	24	17	26	21	29	26	32	27	34	27	—	28	—
Columbia	—	19	12	21	15	24	18	26	19	27	21	28	22	29
SOUTH DAKOTA														
Huron	−30	−22	−27	−20	−25	−18	−24	−16	−23	−15	−23	−15	−22	−14
Rapid City	−29	—	−27	−20	−25	−18	−24	−17	−21	−11	−18	−7	—	—
TENNESSEE														
Knoxville	−1	9	5	15	6	17	8	18	10	19	11	20	12	21
Memphis	−1	9	4	12	6	14	8	15	9	16	9	17	10	18
TEXAS														
Amarillo	—	4	−2	8	0	11	2	14	3	16	4	—	—	—
Brownsville	24	30	29	36	30	38	32	40	34	41	—	42	—	—
El Paso	11	22	16	27	20	30	21	32	23	—	—	—	—	—
F[illegible]t Worth	4	16	10	20	12	22	13	23	13	24	14	25	16	26
San Antonio	16	22	18	26	21	28	22	30	23	31	24	32	25	34
UTAH														
Modena	—	−14	−24	−11	−20	−9	−16	−1	−14	0	−12	2	−10	4
Salt Lake City	−9	−2	−7	1	−5	4	−1	8	2	12	4	14	6	—
VERMONT														
Burlington	−29	−19	−23	−14	−19	−9	−18	−7	−16	−4	−15	—	−14	—
VIRGINIA														
Lynchburg	−1	—	2	14	4	15	6	16	7	17	8	18	9	19
Norfolk	6	13	10	15	12	17	14	21	16	22	17	23	18	24
Wytheville	−6	4	−4	8	−2	10	−1	11	0	12	1	13	3	13
WASHINGTON														
Seattle	14	18	16	20	18	24	20	25	22	26	—	—	—	—
Spokane	−15	−6	−11	−2	−8	0	−6	2	−4	5	—	7	—	—
Yakima	−16	−9	−10	2	−8	4	−4	6	1	9	—	—	—	—
WEST VIRGINIA														
Elkins	−17	−1	−8	2	−6	3	−5	4	−4	6	−3	8	−2	—
Parkersburg	−14	−1	−9	2	−7	4	−4	6	−3	8	−1	9	1	10
WISCONSIN														
Green Bay	−24	−13	−20	−10	−19	−9	−19	−8	−18	−7	−17	−6	−15	−5
La Crosse	−27	−16	−24	−14	−21	−12	−19	−10	−17	−8	−16	−6	—	—
Milwaukee	−19	−10	−17	−8	−13	−6	−11	−4	−10	−2	−9	−1	−8	0
WYOMING														
Encampment	−31	−17	−26	−11	−21	−7	−16	−3	−14	2	−11	5	−10	—
Lander	−35	−22	−29	−17	−25	−14	−23	−12	−19	−9	−17	—	−16	—
Sheridan	—	−22	−32	−20	−29	−18	−25	−13	−21	−11	−19	−9	—	—
Yellowstone Park	−34	−23	−29	−19	−27	−16	−22	−10	—	−8	—	—	—	—

for instance, should be designed for a lower outside temperature than a home or office building.

A heating system may usually be operated above its design rating to tide over an occasional cold day. If design temperatures for all locations were to be selected for the same frequency of recurrence, the percentage overload which might be demanded in extreme weather would vary widely. In general, the higher overloads would occur in the warmer localities, but there are wide variations from this rule.

Since some of the data necessary for the calculation of possible overloads are not given in this paper, Table 3 has been included. This table gives the percentage overload on a heating system on the coldest day if the design temperature is taken as the lowest daily mean temperature likely to recur with a frequency of twice per year, and an inside design temperature of 75 F is used. The temperature of the *coldest day* is taken as the lowest daily mean temperature which occurred four times during the 23-year period studied, or which may, therefore, be expected to recur with a frequency of approximately once in six years. This is consistent with previous discussions concerning the use of extremes.

Table 3 shows overloads of as high as 27½ percent. In locations for which unusually high overloads are indicated, designers may wish to select design temperatures for a lower frequency of recurrence. The effect of such a change in selection is illustrated in the following example:

Example Based on Data for New Orleans, La.

Item		Fahr.	
1	Frequency of recurrence of daily mean temperatures used for selection of design temperatures, times per year	Twice	Once
2	Design temperatures for frequency noted (Table 1)	36	33
3	Temperature difference, 75 F minus design temperature	39	42
4	Lowest temperature to be considered. (Daily mean temperature recurring with a frequency of once in six years[a])	27	27
5	Design temperature minus lowest temperature (Item 4)	9	6
6	Overload on cold day. (Item 5 ÷ Item 3) × 100	Percent 23.1	 14.3

[a]These values are taken from the original paper[2] by the author.

It may be seen from the foregoing tabulation that the probable overload for the city of New Orleans will be reduced from 23.1 to 14.3 percent, by selecting the design temperature for a frequency of recurrence of once instead of twice per year. A similar change in selection of design temperatures will reduce even the highest values in Table 3 to approximately 18 percent, and in all except five cases they will reduce to 15 percent or under.

Table 1 has been presented as a basis for the selection of heating design temperatures. The suggested method of determining design temperatures indicates clearly that it does not eliminate the need for engineering judgment. Instead, it affords the engineer an opportunity to make an intelligent selection of outside design temperature.

It is the author's belief that winter design temperatures recommended and used today in most sections of the country are too low. The actual frequency of recurrence of daily mean and daily minimum temperatures for a 23-year period as given in Table 1 is the best reason

Table 3—Percent Overload on Heating Plant on Coldest Day if Design Temperature is Taken as the Lowest Daily Mean Temperature Likely to Recur with a Frequency of Twice per Year, and the Inside Design Temperature is 75 F

Station	Percent Overload
ALABAMA	
Birmingham	20.0
Mobile	16.7
ARIZONA	
Flagstaff	10.4
Phoenix	14.7
Yuma	22.6
ARKANSAS	
Fort Smith	24.6
Little Rock	20.0
CALIFORNIA	
Eureka	10.5
Fresno	15.4
Los Angeles	10.0
San Francisco	14.7
COLORADO	
Denver	13.5
Durango	11.6
Grand Junction	11.3
Trinidad	24.3
CONNECTICUT	
New Haven	16.9
FLORIDA	
Jacksonville	23.7
Tampa	20.0
GEORGIA	
Atlanta	21.2
Savannah	27.5
MARYLAND	
Baltimore	15.3
Cumberland	11.1
MASSACHUSETTS	
Boston	18.2
MICHIGAN	
Alpena	10.5
Detroit	12.9
Grand Rapids	12.9
Marquette	11.4
MINNESOTA	
Duluth	8.8
Minneapolis	11.5
Moorhead	8.6
MISSISSIPPI	
Vicksburg	14.6
MISSOURI	
St. Joseph	12.0
St. Louis	14.9
Springfield	16.4
MONTANA	
Billings	12.4
Havre	12.2
Helena	8.7
Kalispell	7.1
NEBRASKA	
Lincoln	10.3
North Platte	11.4
OKLAHOMA	
Oklahoma City	14.3
OREGON	
Baker	14.9
Medford	19.6
Portland	11.1
PENNSYLVANIA	
Philadelphia	15.0
Pittsburgh	11.8
Scranton	16.4
Somerset	9.7
RHODE ISLAND	
Providence	15.2
SOUTH CAROLINA	
Charleston	23.8
Columbia	19.2
SOUTH DAKOTA	
Huron	10.1
Rapid City	9.2
TENNESSEE	
Knoxville	19.2
Memphis	15.8
TEXAS	
Amarillo	16.1
Brownsville	25.0
El Paso	17.8
IDAHO	
Lewiston	15.5
Pocatello	11.8
ILLINOIS	
Cairo	14.3
Chicago	10.8
Springfield	12.5
INDIANA	
Evansville	15.4
Fort Wayne	6.9
Indianapolis	11.4
IOWA	
Dubuque	11.2
Keokuk	13.3
Sioux City	10.8
KANSAS	
Concordia	13.7
Dodge City	14.3
Goodland	14.9
Wichita	15.9
KENTUCKY	
Lexington	13.4
LOUISIANA	
New Orleans	23.1
Shreveport	20.4
MAINE	
Eastport	16.0
Portland	15.3
Van Buren	11.1
NEVADA	
Logandale	16.3
Reno	16.1
Searchlight	14.9
Tonopah	17.2
Winnemucca	19.7
NEW HAMPSHIRE	
Concord	14.9
NEW JERSEY	
Atlantic City	18.6
NEW MEXICO	
Roswell	22.8
Santa Fe	14.5
NEW YORK	
Albany	15.1
Buffalo	11.4
New York	19.1
NORTH CAROLINA	
Asheville	15.5
Raleigh	15.4
Wilmington	17.0
NORTH DAKOTA	
Bismarck	9.5
Devil's Lake	9.2
Williston	9.3
OHIO	
Cincinnati	10.1
Cleveland	11.8
Columbus	10.1
TEXAS	
Fort Worth	19.2
San Antonio	25.6
UTAH	
Modena	17.8
Salt Lake City	19.1
VERMONT	
Burlington	14.8
VIRGINIA	
Lynchburg	8.8
Norfolk	17.0
Wytheville	15.9
WASHINGTON	
Seattle	13.7
Spokane	11.0
Yakima	10.0
WEST VIRGINIA	
Elkins	13.0
Parkersburg	12.1
WISCONSIN	
Green Bay	8.4
La Crosse	9.5
Milwaukee	11.5
WYOMING	
Encampment	19.8
Lander	16.1
Sheridan	11.2
Yellowstone Pk.	12.5

in support of this opinion. The following reasons are also presented:

1. The daily minimum temperature usually prevails for such a short period of time that, because of heat storage within the structure, its effect on the heating load is negligible.

2. It is customary to make heat loss calculations and design heating systems on the assumption that the system must furnish all of the heat to the space. This is never true. Instead, the average building receives appreciable quantities of heat from the sun, lights, occupants, mechanical processes, and other extraneous sources. The room heaters which have been sized for 100 per cent of the calculated room loss are helped by the exposed or concealed piping to them.

3. A system that is oversized is difficult to control and may cause more discomfort in average winter weather than a somewhat smaller system will cause on a few extremely cold days. The smaller system will also be lower in first cost and will operate more efficiently throughout the heating season.

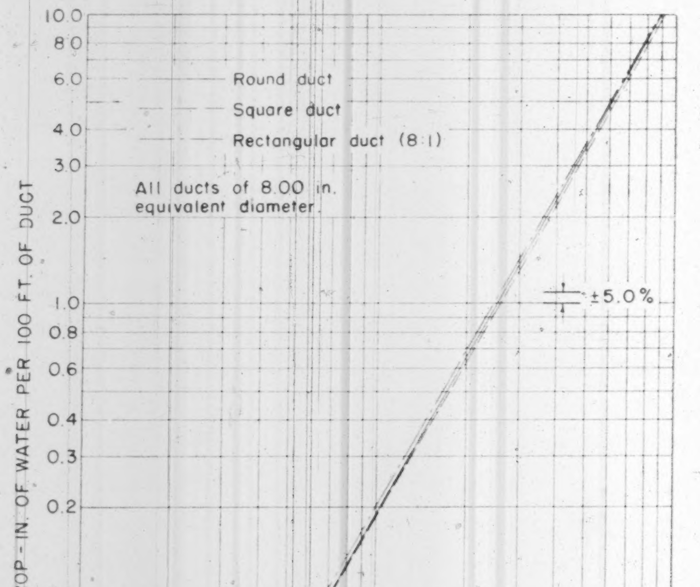

Fig. 4—Comparison of friction pressure loss in inches of water for 100 ft of 8.00 in. equivalent diameter round, square and rectangular ducts

This paper has been written to suggest a method of selecting heating design temperatures, and to present data to assist in such selection. As indicated, the actual selection should be made by the heating engineer who is familiar with all facts concerning construction, occupancy, etc. To serve as a general guide in this matter, however, it is recommended that the design temperature for homes, offices, and similar structures throughout most of the United States be selected from Table 1 as the daily mean temperature which may be expected to recur with an average frequency of two times per year. For similar buildings in locations for which Table 3 indicates unusually high overloads, the temperature may be selected for a frequency of once per year. The values shown in bold type in Table 1 have been selected on this basis and are the design temperatures recommended by the author.

Since it is the difference between inside and outside design temperatures which is used in heat loss calculations, a few words on the inside design temperature may be in order. In the past, it has been customary to use outside design temperatures which are too low, and then to correct at least a part of this error by using an inside design temperature of 70 F, which is also too low. Both inside and outside design temperatures should be selected in a realistic manner. It is a well-known fact, substantiated by laboratory research and ordinary observation, that very few people are comfortable in a home or office heated to only 70 F. The average person in this country finds comfort at about 75 F in cold winter weather[3]. Data are available on the actual dry bulb temperatures found most desirable for various types of buildings and occupancies. These temperatures should be used in design.

Conclusions

1. The daily mean temperature is a better indication of heating load than the daily minimum temperature. It is therefore a more logical basis for the determination of design temperature.

2. The design temperature should be based upon the probable frequency of recurrence of low daily mean temperatures, rather than upon the lowest daily mean or daily minimum temperature on record.

3. There is no one frequency of recurrence which should be used for the selection of all design temperatures. It will depend upon the type of building or the purpose for which it is to be used, and upon local weather peculiarities.

4. The inside design temperature should be that temperature which will actually be maintained in the heated space.

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[3] **Conditions for Comfort,** by Charles S. Leopold. (ASHVE JOURNAL SECTION, *Heating, Piping & Air Conditioning,* June, 1947, p. 117.)

CORRECTION

in the paper

Friction Equivalents for Round, Square and Rectangular Ducts,

By R. G. Huebscher, Cleveland, Ohio.

(published in the December 1947 JOURNAL SECTION)

Because of an error in computations, incorrect pressure drop values are shown in Fig. 4, page 132. The values should have been divided by 5.2.

The corrected Fig. 4 given at the left should be substituted for the same Figure in the December JOURNAL.

H. H. BOND FORMS NEW FIRM

Announcement has been made of the dissolving of the partnership of Edward E. Ashley and Harry H. Bond, consulting engineers, and the formation of a new engineering firm by Mr. Bond at 11 West 42 St., New York, N. Y. Mr. Ashley, a member of the ASHVE, will continue as head of the firm, Edward E. Ashley, consulting engineer, New York, N. Y.

Mr. Bond, who had been an associate of Mr. Ashley for 14 years, joined the ASHVE in 1938. An active member of the New York Chapter, he served as its president in 1942 and as vice president in 1941. He is a member of the Reception Committee of the Committee on Arrangements for the 54th Annual Meeting, to be held in New York in February 1948.

H. H. Bond

PARTNERSHIP FORMED BY G. L. WIGGS

G. Lorne Wiggs, Montreal, Canada, has announced his partnership with John G. Frost, Leslie C. A. Walford and D. Lorne Lindsay in a new firm, Wiggs, Walford, Frost and Lindsay, consulting engineers. The partnership will act as consultants and technical advisers and will render a design and supervisory service in the fields of civil, electrical and mechanical engineering.

Mr. Wiggs, a consulting industrial engineer for many years, joined the ASHVE in 1924. Since then, he has been an active member of the Society, serving as a member of the Council during 1938 throughout 1940 and as president of the Montreal Chapter during 1938. In 1946, when the Montreal Chapter was host for the Semi-Annual Meeting of the ASHVE, Mr. Wiggs took an active part in arrangements for the meeting and presented a paper at the technical sessions.

G. Lorne Wiggs

Both Messrs. Walford and Lindsay are also members of the ASHVE, Mr. Walford joining in 1938 and Mr. Lindsay in 1947. Mr. Walford had been connected with Mr. Wiggs since 1937 as a chief assistant, and Mr. Lindsay held the position of engineer since 1945. Before joining the new partnership, Mr. Frost also held a senior position in the firm.

R. C. CROSS APPOINTED ASSISTANT MANAGER

Robert C. Cross has been appointed assistant manager of the merchandise testing and development laboratories, Sears, Roebuck and Co., Chicago, Ill. Prior to his new assignment Mr. Cross held the position of director of the Sears mechanical laboratory. He joined Sears, Roebuck and Co., in 1941 as a senior combustion engineer.

Mr. Cross, a member of the ASHVE since 1937, is a member of the Committee on Research and is serving on the Technical Advisory Committees on Air Cleaning and Heating Load. He is a member of the Guide Publication Committee and has, for some years, edited the chapters on fuels and combustion. Mr. Cross also holds membership in the *American Society of Mechanical Engineers*.

R. C. Cross

JOURNAL SECTION

WEBSTER TALLMADGE DEAD AT 63

Webster Tallmadge, East Orange, N. J., died in a private nursing home on November 25, 1947. Several years ago he retired as president of the Webster Tallmadge Co., Inc., manufacturers of heating and ventilating equipment, founded by him in 1924.

Born in Ballston Spa, N. Y., in 1884, Mr. Tallmadge attended Franklin Union, Boston, Mass., and the Lowell Institute of the Massachusetts Institute of Technology. In 1904 he joined the Westinghouse Electric Corp., East Pittsburgh, Pa., where he was active in general engineering, and in 1908 he became associated with the St. Paul Gas Light Co., St. Paul, Minn., as a chief engineer. He returned to the Westinghouse staff in 1909 and remained with this company until 1920 when he was appointed manager of power for the Thomas A. Edison Inc., Orange, N. J. In 1923 he joined the Donnelly Systems Co., New York, N. Y., as an engineer, leaving in 1924 to form his own company.

Mr. Tallmadge joined the ASHVE in 1924 and was an active member of the New York Chapter. He also held membership in the *American Society of Mechanical Engineers*. He is survived by his wife, Mrs. Grace Hadley Tallmadge, a daughter, Mary W. Tallmadge, and a son, Howard W. Tallmadge, to whom the Officers and Council of the Society extend their sincere sympathy.

N. P. FENNER DIES OF HEART ATTACK

On November 12, 1947, a heart attack proved fatal to Nicholas P. Fenner, partner in Fenner & Potvin, Chicago, Ill. Death occurred at his home in Elmhurst, Ill.

A native of Cincinnati, Ohio, where he was born on April 8, 1900, Mr. Fenner attended high school and Chicago Technical College. He started his career in the heating industry by joining the staff of the Hoffman Specialty Co., Chicago, Ill., in 1919. After he represented several eastern branches of this company for eight years, he returned to Chicago in 1936 as district representative. In July 1944, Mr. Fenner and Leo J. Potvin established the partnership of Fenner & Potvin, manufacturers' representatives.

Mr. Fenner was a member of the ASHVE for 20 years, and took an active part in the affairs of the Illinois Chapter. He was also a member of the *Western Trade Golf Association* for a number of years. Surviving Mr. Fenner are his wife, son and daughter, to whom the Officers and Council of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS extend their heartfelt sympathy.

J. HERBERT WALKER DIES AFTER SEVERE ILLNESS

J. Herbert Walker

J. Herbert Walker died at his home, Birmingham, Mich., after a severe illness, on December 1, 1947.

A vice president of The Detroit Edison Co., Detroit, Mich., Mr. Walker was an engineer-executive of the company for many years, and was first employed by the firm in 1912. Before his election as a vice president in 1945, Mr. Walker was assistant to the general manager and was active in organization planning and as a consultant on various commercial and engineering problems. He achieved national recognition in the field of heating and air conditioning and was for many years superintendent of the central heating department which supplies steam to the principal buildings in downtown Detroit.

In recent years Mr. Walker had the responsibility for personnel matters of the company, which included employment, personnel planning, medical, safety and legal departments. He developed a new style and practice for answering employees' queries called *The Question Box,* which became one of the most widely read features of the company's employee magazine, *Synchroscope.*

Born in Detroit, March 9, 1890, Mr. Walker was a mechanical engineer who graduated from the University of Michigan in 1911 and obtained his master's degree in engineering in 1937.

In November of this year he was given the F. Paul Anderson Medal, the highest award of the AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, for his notable contributions to the advancement of the profession and his many distinguished services to the Society. In transmitting the medal Pres. Baldwin M. Woods said, "The congratulations and best wishes of your fellow members in the ASHVE are extended to you and we all hope that you will visualize in the F. Paul Anderson Medal an expression of our high regard for your many services to the Society which were rendered without thought of reward but only to give aid to your fellowman."

During the thirty-one active years he was a member of the Society, Mr. Walker served as: second vice president, member of the Council, chairman of the Committee on Research, Guide Publication, Finance, Standards, and Executive committees, and as a member of many technical advisory committees.

Mr. Walker was elected president of the *National District Heating Association* in 1921 and in 1943 was honored with life membership in this association. He was also a member of the *Engineering Society of Detroit,* the *American Society of Mechanical Engineers,* Sigma Xi, Tau Beta Pi, and the Detroit Athletic Club.

A well known author of heating and ventilating articles, Mr. Walker contributed articles on this subject to the Encyclopedia Britannica and the JOURNAL of the Society. He was coauthor of the books, *Heating and Air Conditioning,* and the *Piping Handbook.*

He is survived by his wife, Mrs. Gertrude Walker, and two sons, Morley and James H. Walker, Jr., to whom the Officers and Council of the Society extend their heartfelt sympathy for their loss. Mr. Walker's funeral was held December 4, and the Society was officially represented by A. E. Stacey, Jr., second vice president, J. F. Collins, Jr., treasurer and A. E. Knibb, president of the Michigan Chapter.

Method of Choosing Location of, Financing and Conducting Meetings of the Society

Resolved: That inasmuch as the Annual and Semi-Annual Meetings of the Society come under the jurisdiction of the Council, the following rules governing the handling of such meetings be adopted by the Council and published in the JOURNAL of the Society at least twice during every year, preferably just prior to each meeting.

1—The Council will select the city in which the Annual or Semi-Annual Meeting is to be held, giving due consideration to the invitations received from Chapters or members as well as to the advisability of so distributing those meetings as to make them of the greatest advantage to the general membership, and to reduce as far as possible the expense of members attending.

2—That an appropriation be made to cover the entertainment or local expenses, incurred in connection with the meeting, not exceeding $500.00, the regular meeting expense to be taken care of by the General Fund of the Society in the regular way.

3—That no registration fee or compulsory obligations of any nature be imposed on members or guests.

4—That the purchase of tickets for banquets or for any other form of entertainment that may be provided be entirely voluntary.

5—That the grouping of features and the sale of tickets for group features be discouraged.

6—That the raising of funds from manufacturers of heating apparatus be discouraged.

7—That the display of samples, or of literature, advertising the product of any manufacturer in any way, shape or form, be not permitted at the booths, registration desk, or in or about the meetings.

8—That the distribution of trade papers be entirely at the discretion of the committee in charge.

9—That the local Chapter or local members be empowered to form a General Committtee with such sub-committees as may be required to handle the details of transportation, hotel accommodations, entertainment, finance, etc., and that this General Committee be requested to confer frequently with the Council, through the Secretary of the Society, and to make frequent reports on progress in connection with the various matters being handled by them.

10—That the arrangements of elaborate and costly entertainment features be discouraged.

Adopted at Council Meeting, January 29, 1926

Summary of Local Chapter Meetings[*]

Atlanta—November 7, 1947. Subject: Air Distribution. Speaker: V. M. Lathers, Barber-Colman Co., Rockford, Ill. Members and visitors found Mr. Lathers presentation of his subject very interesting and informative. Other Features: A report was given on chapter finances and on future meeting programs. S. W. Boyd reported on local codes and the secretary, Leo Sudderth, Jr., read the report of the nominating committee. L. L. Barnes was selected to act as chapter delegate to the Annual Meeting. F. W. Bull reported on the Chapter research committee's work and on a proposed research project on panel heating at Georgia Tech. Attendance 65. Attendance ratio 0.58.

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Central New York—November 12, 1947. Joint Meeting with *ASRE*. Subject: Heat Pump. Speakers: Prof. C. O. Mackey, Cornell University, E. P. Palmatier, Carrier Corp., W. A. Turnbull, New York State Electric & Gas Corp. Professor Mackey, after explaining the fundamental theory of the heat pump, proposed means for improving coefficients of performance, and indicated the fields of application. Mr. Palmatier, in commenting on a number of installations he has recently visited in the field, indicated that there are many technical and economic problems to be solved. An interesting and factual account of his company's experiences with two trial installations in the Binghamton area, was given by Mr. Turnbull. Attendance 97.

Central New York—October 15, 1947. Subject: Early Developments of Industrial Air Conditioning. Speaker: A. E. Stacey, Jr., second vice president of the ASHVE, and process consultant, Carrier Corp., Syracuse, N. Y. In his interesting talk Mr. Stacey mentioned that many of the early problems in air conditioning were due to the nonexistence of design and estimating data. He also stated that control applications were developed very rapidly and although present day instrumentation represents a considerable advance, the basic schemes have remained essentially unchanged through the years. Other Features: An inspection trip through the factory and development laboratories of the Carrier Corp. Attendance 32.

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Central Ohio—October 29, 1947. Joint meeting with Columbus Chapter of the *AIEE*. Subject: Panel Discussion on Smoke Control Problems. Moderator: R. B. Breneman, branch manager, Armstrong Cork Co., Columbus, Ohio. Members of the panel who discussed some interesting problems on smoke control and answered questions from members, were: Dr. T. D. Yensen, Westinghouse Research Laboratories; Carl Danbeumire, chief engineer, Columbus division of smoke control; and H. B. Lammers, Cincinnati, director of engineering, Coal Producers' Committee for Smoke Abatement. Attendance 45. Attendance ratio 0.4.

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Cincinnati—October 7, 1947. Subject: Industrial Application of Ultraviolet Lamps to Air Conditioning Installations. Speaker: Dr. J. F. Kowelewski. Members enjoyed Dr. Kowelewski's talk and the lively discussion period which followed. Other Features: Reports were given by the various committee chairmen and A. W. Edwards gave an interesting report on the Semi-Annual Meeting held at Coronado, Calif. Attendance 52.

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Golden Gate—November 6, 1947. Subject: Evaporative Cooling *vs* Mechanical Refrigeration in Comfort Air Conditioning. Moderator: H. M. Hendrickson, refrigerating and air conditioning engineer, Preston Construction Co., San Francisco, Calif. Many interesting points concerning the subject were brought out by the other speakers, F. W. Jordan, T. A. Marshall, Leo Hungerford, and R. S. Farr. Other Features: John Everetts, Jr., mentioned the favorable comments received regarding engineering articles which have been published in recent issues of the chapter's publication the *Fog Dispenser*. Pres. F. W. Kolb announced that members of the Golden Gate Chapter were invited by the Southern California Chapter to share a private railroad car arranged for the convenience of the West Coast members who plan to attend the 54 Annual Meeting in New York in February 1948. Attendance 99.

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Illinois—November 3, 1947. Subject: Fan Selection with Respect to Sound and Acoustical Treatment of Ducts. Speaker: T. A. Walters, director of research, American Blower Corp., Detroit, Mich. Mr. Walters thoroughly covered his subject, discussing the various types of sound and measuring equipment, the meth-

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[*] Note: The attendance ratios shown represent the membership attendance divided by the chapter membership. These ratios will be useful as a partial indication of interest shown by local chapter members in various types of subjects programmed by the various chapters and may be useful in deciding on subjects for chapter meetings.

For complete Program of 54th Annual Meeting see page 140

ods of measuring sound, the decibel and its use in fan noise measurement, the various types of fans and the method of selecting fans with respect to sound. His discussion was especially interesting as he used well prepared slides to explain with great clarity the basic considerations of his subject. Other Features: New Members and guests were introduced, and members were reminded of the 54th Annual Meeting scheduled for New York. Attendance 110.

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INDIANA—October 24, 1947. Subject: The Effect of Temperature and Humidity on the Human Body. Speaker: Nathaniel Glickman, University of Illinois, School of Medicine, Chicago, Ill. A discussion period followed Mr. Glickman's informative talk. Attendance 42.

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IOWA—November 20, 1947. Joint Meeting with the *ASME* Student Section of Iowa State College, and the Central Iowa Section of the *ASME*. Subject: Technology Tomorrow. Speaker: Dr. Baldwin M. Woods, president of the ASHVE and director, University Extension, University of California, Berkeley, Calif. Dr. Woods outlined inventions which had been developed in the past and also explained the effect on our way of living of future inventions that are likely to be developed. Dr. Woods' able presentation was very well received and held the interest of the entire audience. Attendance 264.

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MANITOBA—October 23, 1947. Subject: Business Meeting. D. S. Swain was appointed chapter delegate to the 54th Annual Meeting with Einar Anderson, serving as alternate. A discussion was held regarding the annual Christmas party and it was decided that arrangements for the party would be made by the attendance committee. A discussion regarding the monthly meeting place was also held. A letter was sent to Dr. Baldwin M. Woods, president of the society, asking him to visit the chapter during the coming year. Attendance 15.

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MICHIGAN—November 17, 1947. Subject: The Development of Air Conditioning and Its Application to the Industries of the Future. Speaker: A. E. Stacey, Jr., second vice president of the ASHVE and process consultant, Carrier Corp., Syracuse, N. Y. In his talk Mr. Stacey recalled the practices, equipment and design information available when the first air conditioning systems were installed for industrial processing. Modern improvements in equipment and the importance of conditioning for many phases of industrial development were also discussed by Mr. Stacey who was accorded a rising vote of thanks for his interesting and instructive talk. Other Features: A report was given regarding the activities of the program committee and the treasurer gave his report. A motion was carried that flowers be sent to J. H. Walker, former second vice president of the ASHVE, who is confined to his home by illness. Attendance 88.

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MINNESOTA—November 3, 1947. Subject: Test Results on Warm Air Floor Panel Heating. Speaker: Prof. A. B. Algren, University of Minnesota, Minneapolis, Minn. Professor Algren used slides in presenting details of construction and ground temperature conditions and heating results. The subject was presented with clarity and great interest was shown by attending members and guests. Other Features: William Sturm, in reporting for the membership committee, stated that prospective members were viewing the activities of the Chapter with an increased interest. Attendance 146.

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MONTREAL—October 17, 1947. Subject: Using Liquids at High Boiling Point as Heating Media. Speaker: O. O. Oaks, director of research, J. B. Pierce Foundation, Raritan, N. J. Mr. Oaks' capable presentation was enjoyed by members who demonstrated their keen interest in his topic during the discussion which followed. Other Features: Leo Garneau spoke briefly on his trip to the Semi-Annual Meeting held in Coronado, Calif. Attendance 36.

MONTREAL—September 24, 1947. Subject: Social Meeting. Members and their guests participated in a golf tournament and dinner party. The chapter trophy was awarded to A. F. Lamontagne. A note of thanks for an enjoyable evening was extended to the sports committee. Attendance 47.

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NEBRASKA—November 11, 1947. Subject: Electric Precipitator. Speaker: Thomas D. Price, Raytheon Mfg. Co. Mr. Price illustrated his talk with slides and a demonstration. Other Features: K. R. Magarrell was elected as chapter delegate to the 54th Annual Meeting with K. Martin serving as alternate. Members of the nominating committee were also elected. Attendance 33.

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NEW YORK—November 17, 1947. Subject: What's Ahead in Home Heating. Speaker: Carl F. Boester, housing research executive, Purdue Research Foundation, Purdue University, Lafayette, Ind. Mr. Boester, in describing the housing research program at the University, stated that every phase of single family house construction had been investigated. He described the different types of installations which had been made in experimental houses and some of these installations were shown in a series of slides. Following the discussion period, Mr. Boester was given a rising vote of thanks for a very interesting and instructive presentation. Other Features: Pres. M. C. Giannini introduced P. A. Croney, former president of the Massachusetts Chapter, and Alfred J. Offner, past president of the ASHVE. J. A. Rice, chairman of the Christmas party committee, announced the arrangements being made for this party. Attendance 115. Attendance ratio 0.24.

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NORTH CAROLINA—October 10, 1947. Subject: Solar Radiation. Speaker: M. J. Wilson, engineer, Carrier Corp., Atlanta, Ga. Mr. Wilson illustrated his interesting subject with slides. Other Features: The treasurer gave his report for the year. Officers for the 1947-48 year were elected as follows; Earl S. deWitt, *president;* DeParx Stimson, *vice president;* R. M. Warren, Jr., *secretary and treasurer;* Harry Hoffman and Sterling Nicholson, members of the *board of governors.* Attendance 52.

NORTH CAROLINA—April 25, 1947. Subject: Air Distribution. Speaker: V. M. Lathers, Barber-Colman Co., Rockford, Ill. Mr. Lathers handled his topic in an able manner and his talk proved of great interest to members. Attendance 51.

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NORTH TEXAS—November 17, 1947. Subject: Engineering of Chilled Water Coils. Speaker: J. A. Bishop, district manager, American Blower Corp., Dallas, Tex. Psychrometric charts were distributed by the speaker so that the various points made in his talk would be clear to the audience. Mr. Bishop's well prepared talk proved of great interest to members and guests. In commenting on Mr. Bishops talk, Ross Zumwalt pointed out the problems which confront the consulting engineer in selecting and specifying chilled water coils. L. S. Gilbert spoke briefly concerning the manufacturer's viewpoint on the sales and application of chilled water coils. A. B. Ullrich, Jr. supplemented Mr. Gilbert's remarks, stating that in his opinion, the actual engineering of the coil selection should be done by the consulting engineer, rather than specifying final results only and expecting the contractor to make an intelligent coil selection. Other Features: Brief reports were given by the chairmen of the membership and program committees, and nominations for the 1948 Officers were announced. C. R. Gardner was appointed chapter delegate to the 54th Annual Meeting in New York. Attendance 65.

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OKLAHOMA—November 10, 1947. Subject: Analysis of Sportscasting and Modern Football. Speaker Curt Gowdy, sportscaster, Station KOMA, Oklahoma City. Eddie Lane gave a very humorous talk on Advertising Through Radio. Both speakers were provided by the artist's bureau of Radio Station KOMA when the scheduled speaker of the evening was unable to attend because of a last minute cancellation of plans. Attendance 20. Attendance ratio 0.75.

OKLAHOMA—October 13, 1947. Subject: Operations Crossroads. Speaker: John M. Wright, chief torpedoman, United States Navy. Chief Wright showed the official, filmed report of the Bikini atom bomb tests as prepared by the United States Army, Navy and Airforce. Other Features: The members of the membership and program committees were announced and an announcement was also made concerning the Society's 54th Annual Meeting which is to be held in New York. Attendance 40.

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ONTARIO—November 3, 1947. Subject: Smoke Abatement. Speaker: W. S. Major, Bituminous Coal Research Inc., Pittsburgh, Pa. Members indicated their interest in this topic during the discussion period which followed. Attendance 89. Attendance ratio 0.64.

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PITTSBURGH—November 10, 1947. Joint Meeting With Pittsburgh Chapter of *ASRE*. Subject: Technology Tomorrow. Speaker: Dr. Baldwin M. Woods, president of ASHVE and director of the University Extension, University of California, Berkeley, Calif. Dr. Woods stated that certain inventions which date back to 1900 are the basic foundation of great industries. These inventions include the telephone, automobile, airplane, rayon, radio and motion pictures. He also explained the future technological needs of human beings. Dr. Woods presented his subject in an extremely able manner, and his talk was greatly appreciated by members and guests. Other Features: Among the honored guests attending the meeting were the members of the ASHVE National Council who were introduced. I. Rosenberg, president of the *ASRE,* spoke briefly concerning his organization and D. W. Loucks, president of the Pittsburgh Chapter of the Society spoke on behalf of the ASHVE. Attendance 95. Attendance ratio 0.56.

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ST. LOUIS—November 7, 1947. Joint meeting with the *ASRE* and the Engineer's Club of St. Louis. Subject: Centrifugal Refrigeration in Air Conditioning. Speaker: Louis Elmer, district manager, Carrier Corp. Mr. Elmer presented his subject in an extremely interesting manner and a lively discussion period followed. Attendance 260.

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SOUTH TEXAS—November 11, 1947. Subject: Economic Philosophy of the Professional Engineer. Speaker: E. E. Rosaire, owner and general manager, Subterrex Consultants in geochemistry and geophysics. Mr. Rosaire's stimulating talk was enjoyed by members and guests, many of whom joined in the discussion period which followed. Other Features: President Mills called for the reports of the various committees and the treasurer's report was read. A contribution of $150 was made to send a member of the Texas A. and M. College Student Branch to the

54th Annual Meeting in February. Attendance 69.

South Texas—October 17, 1947. Subject: Modern Frequency Modulation Broadcasting Stations. Speaker: Charles L. Kribs, Jr., engineer and member, South Texas Chapter. Mr. Kribs' highly technical and informative talk dealt with sound in relation to modern frequency modulation. Other Features: Reports from the various committees were given, and Reg. F. Taylor stated that he expected to attend the National Council Meeting in Pittsburgh, Nov. 10. D. M. Mills, chapter president, announced that Lloyd Howell, recently appointed to life membership in the Society, had also been elected to life membership in the South Texas Chapter. A report on the purpose and program of the Engineers Council of Houston was given by A. F. Barnes. State fire laws and ordinances and the work of the Chapter Code Committee were also discussed. Attendance 70.

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Southern California—October 15, 1947. Subject: Heat Transfer Phenomena of Interest to Heating and Ventilating Engineers. Speaker: Dr. L. M. K. Boelter, dean of engineering, University of California, Berkeley, Calif. Dr. Boelter explained the operation of some new equipment developed at the University to measure the heat transmission through materials and the radiant energy applied to a surface from a given source. Slides were used to demonstrate how data from experiments are correlated and put into graphical form for practical use by an engineer. Other Features: A motion was carried that a chapter member be appointed to serve on a committee to act in an advisory capacity for the heating department of the city of Los Angeles. This committee, which would act as a liaison group between the city heating department and industry, would be composed of members from various engineering groups. Pres. R. A. Lowe spoke on the origin of the Chapter's Past President's Pin and presented Art Theobald with the first pin. Attendance 32.

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Utah—October 8, 1947. Subject: Brief History of a Gas Plant. Speaker: D. Watkins, assistant superintendent, Mountain Fuel Supply Co. In speaking of the history of a local gas company, Mr. Watkins discussed some of the obstacles which had to be overcome through the years. He also related some of the problems which occur because of present-day shortages and increased demand for gas fuel. The interest of the members was shown in the number of questions asked during the discussion period. Other Features: Pres. E. V. Gritton announced that all those planning to attend the Annual Meeting in New York should make their reservations as soon as possible and C. E. Ferguson reported on the Semi-Annual Meeting held in Coronado. Attendance 17. Attendance ratio 0.42.

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Washington, D. C.—October 8, 1947. Subject: The Effect of Floor Slab on Cooling and Heating Loads. Speaker: Prof. C. F. Kayan, Columbia University, New York, N. Y. From the lively discussion period which followed it was evident that members enjoyed Professor Kayan's talk, on a subject upon which there had been very little available information in the past. Other Features: After a discussion of the proposed revisions of the chapter by-laws and rules, each article was unanimously approved subject to the approval of the Society's Council. Attendance 58.

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Western Michigan—October 13, 1947. Subject: Heat Transfer to and from Direct-Fired Surfaces. Speaker: Prof. L. G. Miller, head, mechanical engineering dept., Michigan State College, Lansing, Mich. In his talk, Professor Miller reviewed heat transfer from luminous and non-luminous gases, and convection and radiation from surfaces. Other Features: The treasurer's report was read and L. A. Calcaterra reported for the Code Committee. Prof. C. H. Pesterfield, chapter delegate and member of the nominating committee, gave a report on the activities at the Society's Semi-Annual Meeting. Attendance 92. Attendance ratio 1.3.

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Western New York—October 14, 1947. Subject: Operations of the Huntley Road Power Plant. Speaker: George Pollard, Niagara Hudson Power Commission. In his interesting talk, Mr. Pollard stated that the Huntley Road power plant is the third largest in the world, with a total output of 625,000 kva. He also stated that it formerly took 1.33 lb of coal to generate a kilowatt and that with the increased efficiency of the new plants this amount of power will be generated with 0.85 lb of coal. Other Features: A report was given on the successful annual golf party which was held during the summer, and the report of the chairman of the publicity committee, was also heard. A discussion was held on the question of raising the dues, and a delegate was appointed to the Niagara Frontier Engineering Council. Attendance 32. Attendance ratio 0.53.

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Student Branch

Texas A. and M. Subject: Absorption Type Air Conditioning Equipment. Speakers: Charles Crocker, United Gas Corp., Houston, Tex. The second speaker for the evening was John Hopping, Evans Engineering, Houston, Tex., who presented a short and interesting description of chemical dehumidification as employed in air conditioning. In the question and answer period which followed both speakers' interesting presentations, the students were able to obtain a great deal of pertinent information. Other Features: D. M. Mills, president of the Houston Chapter, extended an invitation to members of the student branch to attend meetings of the Houston Chapter. Attendance 51.

Candidates for Membership

The Constitution of the Society, as now amended, requires the following mode of procedure in voting on applicants for membership in the Society. All applications for membership are to be sent to the Secretary and the names of applicants and their references shall be printed in the next issue of the JOURNAL of the Society or sent to the members in other approved manner as ordered by the Council. When the replies are received from references, the Candidate's application shall be submitted to and acted upon by the Committee on Admission and Advancement as soon as possible.

When the Committee on Admission and Advancement has acted favorably upon a Candidate's application and assigned his grade, the Council shall vote upon the election of the proposed Candidate for membership by letter ballot. During the past month 150 applications for membership have been received and the names of these men and their sponsors are published in the following list.

Members are requested to scrutinize the list with care. The Committee on Admission and Advancement, and in turn, the Council, urge members to assume their share of responsibility of receiving these candidates into membership by advising the Secretary promptly of any whose eligibility for membership is in any way questioned.

All correspondence in regard to such matters is strictly confidential, and is solely for the good of the Society, which it is the duty of every member to promote.

Unless objection is made by some member by January 30, 1948, these candidates will be balloted upon by the Council. Those elected to membership will be notified by the Secretary immediately after election.

ALLEN, EDWARD C., Student, A. & M. College of Texas. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: E. S. Holdredge*, W. E. Rohrabacher.

ASKER, GUNNAR C. F., Chief Engr., Dry Air Products Corp. PROPOSERS: T. H. Urdahl, G. W. Campbell. SECONDERS: O. D. Colvin, F. J. Swaney.

ATKINSON, ROBERT P., Grad. Student, University of Minnesota. PROPOSERS: A. B. Algren, R. C. Jordan. SECONDERS: W. Sturm, T. T. Shimazaki.

AUSTIN, HUGH A., Supt. Installation & Serv. Dept., Cahn Electric Co. PROPOSERS: E. J. Kearby, Wm. E. Fitzgerald. SECONDERS: G. A. Burton*, S. K. Patterson, Jr.*

BALDWIN, RALPH T., Treas., E. C. Powers & Son, Inc. PROPOSERS: E. C. Powers, H. B. Prewitt. SECONDERS: J. P. Murdoch, C. J. Lubking.

BAUMAN, CARL S., Exec. Engr., Tex-Air Conditioning Co. PROPOSERS: C. Clegg, S. C. McCann. SECONDERS: P. C. Leffel, D. M. Allen.

BAUMANN, ARNOLD W., Chief Engr., Arthur Harris & Co. PROPOSERS: J. J. Hayes, A. O. May. SECONDERS: C. W. De Land, C. M. Vreuls.

BETTENCOURT, HENRY J., JR., Student, A. & M. College of Texas. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: W. E. Rohrabacher, E. S. Holdredge*.

BOBST, EARL F., Sales, American Radiator & Standard Sanitary Corp. PROPOSERS: F. T. W. Armbruster, M. R. Hamlin. SECONDERS: J. D. Slemmons, D. E. Kitchen.

BOEHLER, LAUREN E., Sales Engr., The Trane Co. PROPOSERS: J. A. Lofte, J. H. Volk. SECONDERS: H. W. Schreiber, R. D. Rodwell.

BOSTON, E. B., Pres., Air Products Equipment Co. PROPOSERS: L. H. Streb, C. E. Crone. SECONDERS: H. G. Gragg, M. J. Bamond.

BOWLES, JOHN R., Sales Engr., Cia Industria e Comercio Glossop. PROPOSERS: Arvin Page, L. H. Allcorn, Jr. SECONDERS: C. C. Steadman, Jr., DeParx Stimson.

BRELAND, BLISH, JR., Student, A. & M. College of Texas. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: W. E. Rohrabacher, E. S. Holdredge*.

BROOKS, JACK A., Student, A. & M. College of Texas. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: W. E. Rohrabacher, E. S. Holdredge*.

BROWN, CLINTON H., Sales Engr., Desco Corp. PROPOSERS: H. E. Grossman, C. J. Lubking. SECONDERS: A. H. Koch, F. H. Buzzard.

BROWN, ROBERT L., Associate Member of Smithey & Boynton. PROPOSERS: F. L. Doering, Fred'k. Grim. SECONDERS: R. V. Dodge, Jr., L. E. Smith*.

BUENZ, NEAL F., Student, A. & M. College of Texas. PROPOSERS: W. E. Long, J. S. Hopper. SECONDERS: W. E. Rohrabacher, E. S. Holdredge*.

BURKE, THOMAS F., Owner, Thos. F. Burke Co. PROPOSERS: R. H. Feltwell, R. S. Dill. SECONDERS: P. R. Achenbach, W. H. Littleford.

CAIRNCROSS, GEORGE F., Pres., Cowlitz Heating Co. PROPOSERS: C. P. Dougherty, O. W. Matthews, III. SECONDERS: E. S. Turner, Dick Blankenship.

CALDWELL, JAMES H., Foreman, Security Mfg. Co. PROPOSERS: C. A. Florsheim, C. V. Werner. SECONDERS: C. L. McMichael, W. E. White.

CLARKE, WILLIAM L., Repr., T. L. Osberger Co. PROPOSERS: J. W. Pulte, S. G. McMaster. SECONDERS: L. A. Calcaterra, Wm. C. De Roo.

CLAY, WILTON L., Sales Engr., Gulf Engineering Co. PROPOSERS: J. S. Burke, G. E. May. SECONDERS: F. G. Burns, J. S. Moynan.

CODDINGTON, BERT A., Draftsman, Coddington Co. PROPOSERS: P. R. Babcock, N. T. Nelson. SECONDERS: J. E. Marshall, F. W. Hook.

CODDINGTON, DWIGHT A., Specification Writer, Coddington Co. PROPOSERS: P. R. Babcock, N. T. Nelson. SECONDERS: J. E. Marshall, F. W. Hook.

COLLINS, DESMOND M., Bldg. Serv. Engr., Stone & Webster Engineering Corp. PROPOSERS: E. R. Blair, H. S. Cole. SECONDERS: D. W. Blair, J. W. Brinton.

COLP, JOHN L., Gen. Mgr., Home Equipment & Supply Co. PROPOSERS: D. G. Ryan*, C. W. Ham*, F. Seyforth*, J. R. Fellows.

DICKSON, JAMES A., JR., Sales Engr., Brazos Engineering Co. PROPOSERS: J. S. Hopper, W. E. Long. SECONDERS: W. E. Rohrabacher, E. S. Holdredge*.

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* Non-Member

For complete Program of 54th Annual Meeting see page 140

JOURNAL SECTION

Doll, Errol V., Engrg. Draftsman, The Austin Co. Proposers: D. P. Holmer, J. E. Marshall. Seconders: E. C. Sanford, C. F. Pride.

Edwards, Raymond L., Mech. Engr., The Austin Co. Proposers: T. J. White, L. H. Cochran. Seconders: John Everetts, Jr., P. R. Babcock.

Eibling, James A., Res. Engr., Battelle Memorial Institute. Proposers: R. B. Engdahl, A. I. Brown. Seconders: R. A. Sherman, P. C. Vyff.

Erickson, Edward A., Res. Engr., Battelle Memorial Institute. Proposers: R. B. Engdahl, R. A. Sherman. Seconders: R. M. Keatts, T. R. Walker.

Erichsen, Erik, Student, Case Institute of Technology. Proposers: G. L. Tuve, L. G. Siegel. Seconders: W. L. Bryan, D. K. Wright, Jr.*.

Farago, William J., Mech. Engr., Dominion Electrohome Ind. Ltd. Proposers: C. A. Pollock, I. M. Fraser*. Seconders: F. A. O. Banks*, W. Barry Clark*.

Fine, Maurice E., Mech. Engr., Harold N. Hermann & Assoc. Inc. Proposers: H. N. Hermann, C. D. Weaver, Jr. Seconders: A. W. Edwards, K. B. Little.

Finnell, Edgar C., Minneapolis-Honeywell Regulator Co. Proposers: C. E. Wiser, S. L. Furber. Seconders: H. D. Woolman, R. C. Harris.

Flanigan, William P., Vice Pres., Lloyd E. Mitchell, Inc. Proposers: E. L. Crosby, H. D. Glaser. Seconders: E. H. Taze, E. R. Queer. *(Advancement)*

Franklin, John K., Htg. Engr., McCrea Equipment Co. Proposers: R. A. Grant, L. G. Humphrey. Seconders: W. L. Hoover, H. Latterner, Jr.

Friedman, Paul R., Engr., M & R Engineering Co. Proposers: O. H. Henry*, M. Stoll*. Seconders: T. A. Reina*, Wm. D. Keller*.

Fritchman, Jack F., Student, Purdue University. Proposers: W. T. Miller, C. F. Warner. Seconders: H. G. Venemann*, D. S. Clark*.

Gawman, Douglas S., Chief Tech. Advisor, Richard Crittall Radiant Heating, Inc. Proposers: John Pryke, G. L. Wiggs. Seconders: R. G. Vanderweil, L. C. A. Walford.

Gendeim, Sigman, Mfrs. Repr., Sigman Gendeim. Proposers: Scott Whitnah, R. C. Jordan. Seconders: William Sturm, T. T. Shimazaki.

Gingras, Gilles C. J., Designer, Canadian Pacific Railway. Proposers: E. R. Trodd, S. W. Salter. Seconders: A. B. Madden, Leo Garneau.

Gleeson, William E., Dist. Mgr., McDonnell & Miller, Inc. Proposers: E. N. McDonnell, W. C. Kelly. Seconders: E. C. Webb, John James.

Goodloe, James C., Jr., Student, A. & M. College of Texas. Proposers: J. S. Hopper, W. E. Long. Seconders: W. E. Rohrabacher, E. S. Holdredge*.

Gowdy, Allen C., Mgr. & Engr., The Huffman-Wolfe Co. Proposers: Leo Sudderth, Jr., W. J. McKinney. Seconders: W. W. Carder, H. K. McCain. *(Advancement)*

Green, Philip A., Engr., John J. Nesbitt, Inc. Proposers: J. W. McElgin, H. B. Hedges. Seconders: A. J. Nesbitt, Isadore Director.

Green, Thomas Z., Student, Tulane University. Proposers: F. P. Fischer, G. E. May. Seconders: J. S. Burke, J. S. Moynan.

Grogin, Gerald K., Student, A. & M. College of Texas. Proposers: W. E. Long, J. S. Hopper. Seconders: W. E. Rohrabacher, E. S. Holdredge*.

Gross, H. Edward, Partner, H. Edward Gross Co. Proposers: J. O. Kirkbride, H. M. Parent. Seconders: M. E. Barnard, F. H. Buzzard.

Guest, James F., Htg. Engr., Timken Silent-Automatic Div. Proposers: J. E. Maynard, W. C. Harrower. Seconders: A. B. Winchell*, E. H. Haugen*.

Hattis, Bernard S., Partner, Robert E. Hattis Consulting Engineers. Proposers: M. J. Bamond, J. E. Patten. Seconders: W. A. Kuechenberg, G. W. Bornquist.

Howard, Charles P., Student, A. & M. College of Texas. Proposers: J. S. Hopper, W. E. Long. Seconders: W. E. Rohrabacher, E. S. Holdredge*.

Hughes, James W., Gen. Elec. Engr., Canadian Pacific Railway. Proposers: A. E. McGuer, F. J. Friedman. Seconders: A. B. Madden, E. W. Twizell.

Hurlburt, Raymond G., Htg. Engr., The Nelson Co. Proposers: W. Dixon, W. W. Jaffke. Seconders: F. R. Bishop, W. S. Boales.

Jackson, Robert E., Jr., Student, A. & M. College of Texas. Proposers: W. E. Long, J. S. Hopper. Seconders: E. S. Holdredge*, W. E. Rohrabacher.

Jalles, Armando R., Design & Sales Engr., Carrier Lix-Klett S. A. Acondicionamiento De Aire. Proposers: Luis Lix-Klett, I. R. S. Maclean. Seconders: O. K. Bjorklund*, E. Lix-Klett*.

Jenner, John W., Pres. & Mgr., Shelley Electric Co. Proposers: D. M. Allen, E. E. Ralston. Seconders: G. D. Yeazel, F. J. Dean, Jr.

Jensen, Alfred F., Student, A. & M. College of Texas. Proposers: J. S. Hopper, W. E. Long. Seconders: W. E. Rohrabacher, E. S. Holdredge*.

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The following candidates are University of Michigan students. They are proposed by Axel Marin and C. F. Kessler, and seconded by F. N. Calhoon, A. B. Epple, and L. S. O'Bannon:

Arar, Raymond M.
Bichler, Joseph S.
Briskin, Ben
Clark, John W.
Dunbar, Daniel H.
Durkee, Myron C.
Grew, Raymond E.
Jorgensen, Earl W.
Kammeraad, K. J.
Ketai, Mitchell R.
Lee, Chia-Chin
Lesley, P. Fred, Jr.,
Linsky, Benjamin
Nyman, Robert A.
Schrock, Robert E.
Stark, Roscoe C.
Weiss, Alex J.
Wigglesworth, George L., Jr.

Candidates Elected

In the past issues of the **Journal** of the Society the names of the following men were listed as Candidates for Membership. The membership grade of each Candidate has been assigned by the Committee on Admission and Advancement and balloted upon by the Council. We are now instructed by the Council to post herewith, as required by **Art. B-III,** *Section* 8, of the By-Laws, the following list of candidates elected:

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James, William B., Br. Mgr., The Brightside Foundry & Engineering Co., Ltd., Birmingham, England.

Landgraf, George F., Vice Pres., Trion, Inc., McKees Rocks, Pa.

Langenberg, Everett B., Engr., Kirkwood, Mo. *(Reinstatement)*

Monteith, Eric M., Designing Engr., Toronto, Ont., Canada.

Patten, Joseph R., Br. Mgr., The Powers Regulator Co., Oklahoma City, Okla.

Schwerman, Carl H., Engr., R. B. Hayward Co., Chicago, Ill.

Shelley, Karl B., Field Engr., Wertz Engineering Co., Reading, Pa. *(Advancement)*

Wanson, Leon J., Chairman of Board, Etabl. Wanson, Brussels, Belgium.

Wolfe, Clarence E., Sr., Reynolds Corporation, Chicago, Ill. *(Advancement)*

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Casperd, Henry W. H., Toronto, Ont., Canada *(Reinstatement)*

Coon, Clifford A., Mgr. Sheet Metal Dept., Klarr & Wilson, Corvallis, Ore.

d'Autremont, Hubert F., Cons. Engr., Los Angeles, Calif.

Dell, John A., Pres., The Dell Corp., Morton Grove, Ill.

English, G. A., Mgr., English & Mould, Ltd., Toronto, Ont., Canada.

Fleck, William R., Mgr. & Partner, M. & T. Furnace Co., Cleveland, Ohio.

Fleming, Clarence L., Owner, Fleming Refrigeration Co., Houston, Tex.

Graham, Robert L., Br. Mgr., American Blower Corp., Richmond, Va.

Hickey, Daniel E., Owner, Pittsburgh, Pa.

Hultgren, John T. B., Asst. Sales Engr., McQuay, Inc., Minneapolis, Minn.

Kahn, Walter C., Jr., Gen. Supvsr., N. Y. Testing Laboratories, Inc., New York, N. Y.

Kimmel, Abel J., Mech. Engr., Raisler Corp., New York, N. Y.

Lappin, Frank S., Mgr., Dravo Corp., Chicago, Ill.

Lockhart, William R., Sales Engr., Washington Refrigeration Co., Washington, D. C. *(Reinstatment)*

Molnari, Bob A., Mgr. & Partner, Eggelhof Engineers, Houston, Tex.

Mooney, Weldon, Partner, Mooney Engineering Co., Kansas City, Mo.

Morrow, E. J., Owner, E. J. Morrow Co., Minneapolis, Minn.

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Ninman, Alex T., Sales R. E. Chase & Co., Portland, Ore.

Plank, Guy W., Dir. of Sales, Drayer-Hanson, Inc., Los Angeles, Calif.

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Thompson, Ian J., Capt., War Dept. Fuel Technologist, The War Office, London, England.

Wilson-Reid, Clyde, Sales Engr., General Air Conditioning & Heating Co., San Francisco, Calif. *(Reinstatement)*

Worth, William E., Sls. & Serv., Engr., Chas. A. Hones, Inc., San Francisco, Calif. *(Reinstatement)*

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Sain, Kenneth L., Field Engr., U. S. Air Conditioning Corp., Oklahoma City, Okla.

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Panel Heating and Cooling: G. D. Winans, *Chairman;* A. B. Algren, R. L. Byers, P. B. Gordon, L. N. Hunter*, John James*, J. S. Locke, H. F. Randolph. *Group A—Heat Distribution Within and Behind the Panel:* L. N. Hunter*, *Chairman;* P. B. Gordon, *Vice Chairman;* A. B. Algren, R. A. Biggs, Wharton Clay, R. S. Dill, H. L. Flodin, Dr. F. E. Giesecke, W. S. Harris, C. F. Kayan, G. D. Lain, R. S. Leigh, C. W. Meininger, D. L. Mills, C. W. Nessell, P. S. Park, S. I. Rottmayer, S. M. Van Kirk, L. H. Yeager. *Group B—Heat Transfer Between the Panel and the Space:* John James*, *Chairman;* H. F. Randolph, *Vice Chairman;* C. M. Ashley, J. T. Bergen, C. F. Boester, Linn Helander, A. L. Jaros, Jr., H. A. Lockhart, C. O. Mackey*, R. A. Miller, G. W. Penney, G. G. Sward, J. M. van Nieukerken. *Group D—Controls:* J. S. Locke, *Chairman;* A. B. Algren, H. W. Alyea, S. D. Browne, P. B. Gordon, W. J. Hajek, A. J. Keating, Dr. Waldo Kliever, H. T. Kucera, J. K. M. Pryke, E. J. Ritchie, C. W. Signor, N. D. Skinner.

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Sensations of Comfort: C. P. Yaglou, *Chairman;* R. S. Arnold, A. R. Behnke, M.D., Thomas Chester, F. G. Ewens, M. K. Fahnestock*, J. D. Hardy, M.D., F. C. McIntosh, A. B. Newton, K. E. Robinson.

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*Member of Committee on Research.

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Central Ohio: Organized, 1944. Headquarters, Columbus, Ohio. Meets, Third Monday. President, R. B. Breneman, 1282 Edgehill Rd., Columbus 8. Secretary, A. E. Norman, Jr., 1150 Chesapeake Ave., Columbus.

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Indiana: Organized, 1943. Headquarters, Indianapolis, Ind. Meets, Fourth Friday. President, I. W. Cotton, 1035 N. Pennsylvania St., Indianapolis 4. Secretary W. R. Fenstermaker, 215 E. New York St., Indianapolis 4.

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Manitoba: Organized, 1935. Headquarters, Winnipeg, Man., Canada. Meets Third Thursday. President, D. S. Swain, 1186 Downing St., Winnipeg. Secretary, A. W. Moss, 26 Ferndale Ave., Norwood, Manitoba.

Massachusetts: Organized, 1912. Headquarters, Boston, Mass. Meets, Third Tuesday. President, Adolph Ehrenzeller, 329 Washington St., Dorchester 21. Secretary, R. T. Kern, 51 Claflin St., Leominster.

Memphis: Organized, 1944. Headquarters, Memphis, Tenn. Meets, First Monday. President, N. C. Ledbetter, 22 S. Cooper St., Memphis 4. Secretary, A. T. Bevil, 1521 Waverly Ave., Memphis 6.

Michigan: Organized, 1916. Headquarters, Detroit, Mich. Meets, First Monday after 10th of month. President, A. E. Knibb, 1003 Maryland Ave., Detroit 30. Secretary, L. A. Burch, 5853 Hamilton Ave., Detroit 2.

Minnesota: Organized, 1918. Headquarters, Minneapolis, Minn. Meets, First Monday. President, L. C. Gross, 5324 Oaklawn Ave., Minneapolis 10. Secretary, L. J. Krause, 2753 4th Avenue S., Minneapolis 8.

Montreal: Organized, 1936. Headquarters, Montreal, Que., Canada. Meets, Third Monday. President, T. H. Worthington, 405 Beaubien St. W., Montreal, Que. Secretary, S. W. Salter, 910 New Birks Bldg., Montreal.

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Nebraska: Organized, 1940. Headquarters, Omaha, Neb. Meets, Second Tuesday. President, Verne Simmonds, 2416 Vane St., Omaha. Secretary, G. W. Colburn, 106 N. 15th St., Omaha 2.

New York: Organized, 1911. Headquarters, New York, N. Y. Meets, Third Monday. President, M. C. Giannini, New York University, New York 53. Secretary, Carl H. Flink, Room 3000, 51 Madison Ave., New York 10.

North Carolina: Organized, 1939. Headquarters, Durham, N. C. Meets, Quarterly. President, E. S. deWitt, 1211 Commercial Bank Bldg., Charlotte. Secretary, R. M. Warren, Jr., 1001 N. Church St., Charlotte 1.

North Texas: Organized, 1938. Headquarters, Dallas, Tex. Meets, Third Monday. President, C. R. Gardner, 1000 St. Louis St., Dallas 1. Secretary, G. A. Linskie, 3124 Milton St., Dallas 5.

Northern Ohio: Organized, 1916. Headquarters, Cleveland, Ohio. Meets, Second Monday. President, John James, 3170 W. 106th St., Cleveland 11. Secretary, W. M. Rowe, 1302 Swetland Bldg. Cleveland 15.

•

Oklahoma: Organized, 1935. Headquarters, Oklahoma City, Okla. Meets, Second Monday. President, W. W. Frankfurt, 519 Apco Tower, Oklahoma City. Secretary, J. H. Spaan, Jr., 1303 N. Klein, Oklahoma City 6.

Ontario: Organized, 1922. Headquarters, Toronto, Ont., Canada. Meets, First Monday. President D. A. Stott, 195 Spadina Ave., Toronto. Secretary, H. R. Roth, 57 Bloor St., W., Toronto, Ont.

Oregon: Organized, 1939. Headquarters, Portland, Ore. Meets, Thursday after First Tuesday. President, C. W. Brissenden, Electric Bldg., Portland 5. Secretary, L. G. Williams, Box 304, Gladstone.

•

Pacific Northwest: Organized, 1928. Headquarters, Seattle, Wash. Meets, Second Tuesday. President, E. H. Langdon, 72 Vine St., Seattle. Secretary, E. J. Rosen, 10238 18th Ave., S. W., Seattle 66.

Philadelphia: Organized, 1916. Headquarters, Philadelphia, Pa. Meets, Second Thursday. President, E. H. Dafter. 12 S. 12th St., Philadelphia 7. Secretary, E. K. Wagner, 2240 N. Broad St., Philadelphia 32.

Pittsburgh: Organized, 1919. Headquarters, Pittsburgh, Pa. Meets, Second Monday. President, D. W. Loucks, 435 Sixth Ave., Pittsburgh 19. Secretary, E. H. Riesmeyer, Jr., 231-33 Water St., Pittsburgh 22.

•

Rocky Mountain: Organized, 1944. Headquarters, Denver, Colo. Meets, First Wednesday. President, J. F. Mohan, 2229 Blake St., Denver 2. Secretary, H. C. Kugeler, 2365 Ash St., Denver 7.

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St. Louis: Organized, 1918. Headquarters, St. Louis, Mo. Meets, First Tuesday. President, J. H. Carter, 710 Key West Ave., Webster Groves 19. Secretary, J. S. Rosebrough, 1014 Arcade Bldg., St. Louis 1.

South Texas: Organized, 1938. Headquarters, Houston, Tex. Meets, Third Friday. President, D. M. Mills, Gray and Crawford, Houston 3. Secretary, L. L. Ladewig, Box 1188, Houston 1.

Southern California: Organized, 1930. Headquarters, Los Angeles, Calif. Meets, Third Wednesday. President, R. A. Lowe, 6381 Hollywood Blvd., Los Angeles 28. Secretary, John L. Blake, 1700 S. Bedford St., Los Angeles 35.

Southwest Texas: Organized, 1946. Headquarters, San Antonio, Tex. President, F. C. Benham, Jr., 702 S. Flores St., San Antonio. Secretary, L. S. Pawkett, 810 Insurance Bldg., San Antonio 5.

•

Utah: Organized, 1944. Headquarters, Salt Lake City, Utah. Meets, First Wednesday. President, E. V. Gritton, 2470 S. 15th, Salt Lake City 5. Secretary, C. E. Ferguson, 838 Garfield Ave., Salt Lake City.

•

Virginia: Organized, 1946. Headquarters, Norfolk, Va. President, R. C. Thomas, 819 Westover Ave., Norfolk 7. Secretary; D. E. Phillips, 707 Briarfield Rd., Newport News.

•

Washington, D. C.: Organized. 1935. Headquarters, Washington, D. C. Meets, Second Wednesday. President, H. H. Hill, 438 Woodward Bldg., Washington 5. Secretary, J. G. Muirheid, 2013 New Hampshire Ave., N. W., Washington 9.

Western Michigan: Organized, 1931. Headquarters, Grand Rapids, Mich. Meets, Second Monday. President, Frank Harbin, Jr., 280 E. 6th St., Holland. Secretary, W. C. DeRoo, 500 E. 8th St., Holland.

Western New York: Organized, 1919. Headquarters, Buffalo, N. Y. Meets, Second Monday. President, G. E. Adema, 39 W. Balcom St., Buffalo 9. Secretary, J. H. Bryce, 88 E. Girard Blvd., Kenmore.

Wisconsin: Organized, 1922. Headquarters, Milwaukee, Wis. Meets, Third Monday. President, J. R. Vernon, 507 E. Michigan St., Milwaukee 2. Secretary, B. M. Kluge, 1817 S. 66th St., Milwaukee 14.

Student Branch

Texas A. & M. College: Organized, 1946. Headquarters, College Station, Tex. Meets, Third Thursday. President, G. H. Jackson, 225 W. Nevada St., El Paso. Secretary, T. V. Burns, Jr., P. O. Box 1651. College Station.

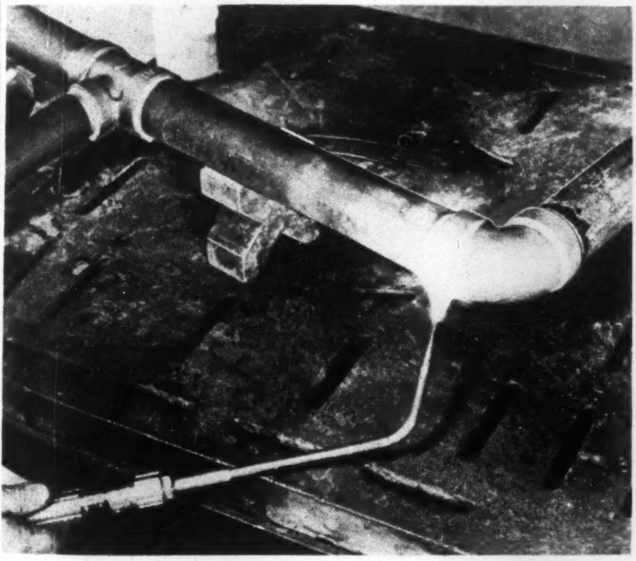
EQUIPMENT DEVELOPMENTS

For your convenience in obtaining more information about any of this equipment, see coupon on this page.

Malleable Pipe Fittings Designed for Brazed Joints

No. 3647—Malleable pipe fittings which are said to be the first threadless malleable fittings made for brazed pipe joints have been introduced by Stanley G. Flagg & Co., Inc., 1421 Chestnut St., Philadelphia 2, Pa.

Designed for brazing to standard black steel or wrought iron pipe, the new fittings are currently made in sizes up to and including 2 in. They are said to be applicable wherever 150 psi standard weight, black, malleable screwed fittings are now used—that is, for 150 psi working steam pressure at 450 F, or 300 psi nonshock, oil, water, or gas lines at 150 F. The cup of the fitting is reamed to accommodate the outside diameter of standard pipe and also to produce a shoulder or stop for the pipe when it is inserted.



According to the manufacturer, no special skill is required to make the silver brazed joint. Outstanding advantages are said to include savings in weight by the use of relatively thin wall thickness of pipe (possible by using the full wall thickness), low cost, the ability to withstand vibration, the fact that a permanently tight joint is provided, and excellent flow characteristics which are provided by the smooth, unbroken, and pocketless interior design.

Electronic Control System Regulates Street Car Temperatures

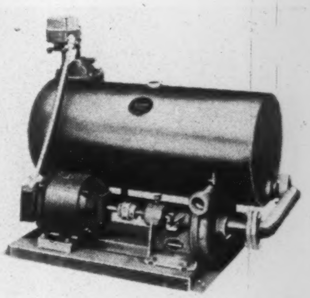
No. 3648—An electronic temperature control system for street cars, said to be the first of its kind, will be installed on the 100 new cars of the Pittsburgh Railway Co., according to an announcement by Minneapolis-Honeywell Regulator Co., 2604 4th Ave., S., Minneapolis 8, Minn.

Designed to provide accurate, automatic control of both heating and ventilating, the controls were developed for the streamlined cars now on order by the Pittsburgh transit system and being built by the St. Louis Car Co.

The ventilating system of each car is designed to handle 14,000 cfm at maximum capacity and to take advantage of body surface cooling by creating high velocity air currents throughout the car interior. Called pressure ventilation, the system is said to be ideally suited for short term occupancy and to offer many advantages.

The heating system uses waste heat generated by the electric accelerating resistors of the car's traction motors, plus an auxiliary electric heater. By a system of dampers, regulated by the thermostat, the waste heat is diverted either into the car depending upon demand, or exhausted to the outside air. Using modulating motors to position the dampers, the electronic control system mixes heated air with cool outside air to hold interior winter temperatures at the point selected.

Design Simplicity Features Condensate and Boiler Feed Pump



No. 3649—A new low cost condensate and boiler feed unit has been placed in production by Skidmore Corp., St. Joseph, Mich., manufacturer of industrial pumps for over 25 years.

Features of the new unit are said to include initial economy and low operating cost due to the simplicity of design. The pump embodies low receiver inlet with capacities of 1000 to 65,000 sq ft EDR and discharge pressures from 10 to 75 psi. It

(Continued on page 246)

Heating, Piping & Air Conditioning **[1-48]**
6 N. Michigan Ave., Chicago 2, Ill.

Please ask the manufacturers to send me more information about the equipment mentioned under the following reference numbers in Equipment Developments and Recent Trade Literature.

(Circle each number in which you are interested)

3647 3648 3649 3650 3651 3652 3653 3654 3655 3656
3657 3658 3659 3660 3661 3662 3663 3664 3665 3666
3667 3668 3669 3670 3671 3672 3673
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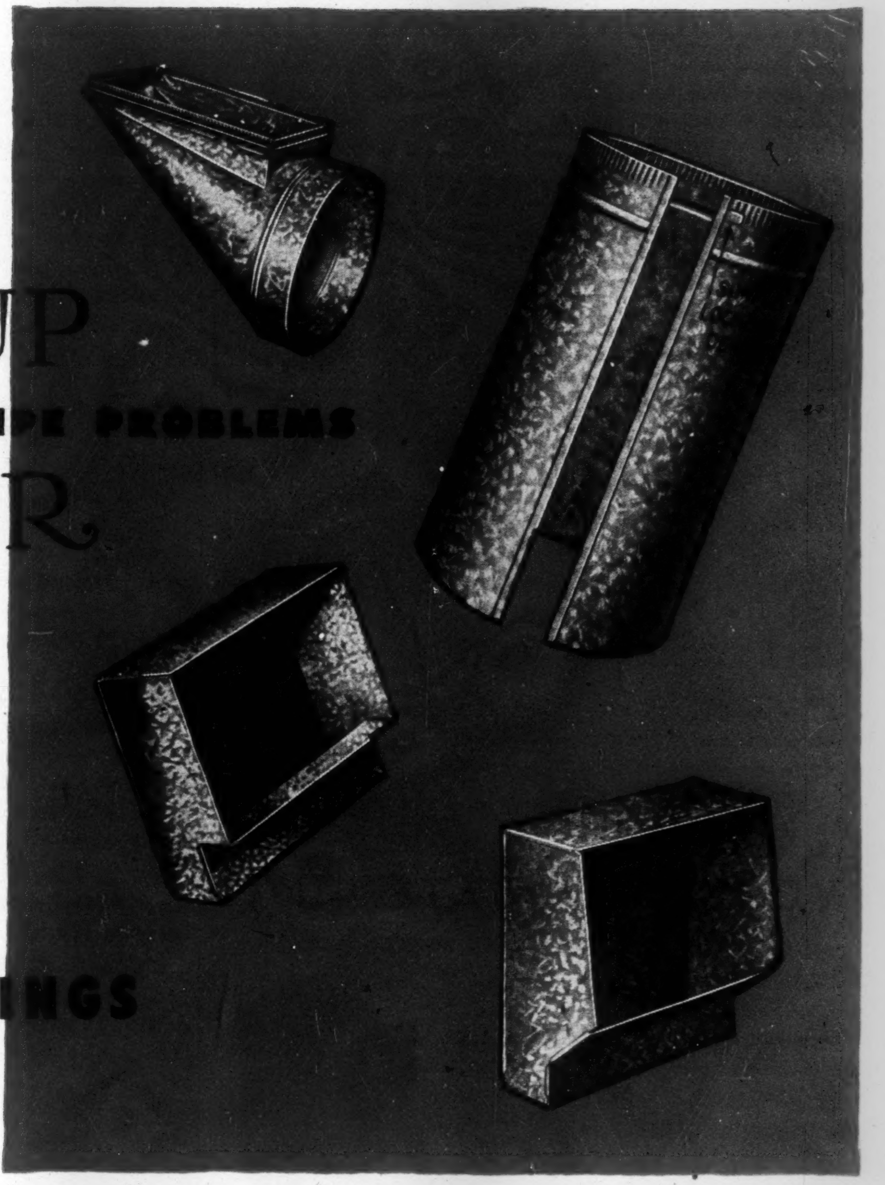

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You can solve your furnace pipe and fittings problem faster because C&L-Lamneck fittings have standard dimensions with full capacities. They are sized right in manufacturing for accurate fit and ease of installation.

The warm air gravity line is complete. The Series 700 system for forced air line is now complete except for plenum chamber, trunk and large trunk fittings.

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FURNACE PIPE
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WINTER-CONDITIONING TIME

Heating plants which passed the test of the Fall season may need further improvement to meet the rigors of winter. Dealers and jobbers will do well to stock WEIL Pumps **now** against such emergencies.

HOT WATER CIRCULATING PUMP

for

Warehouses
Hospitals
Schools

Industrial Plants
Apartment Buildings

WEIL Pump Type R

FIG. 5001

The pump illustrated is designed for and features a mechanical seal for hot water service.

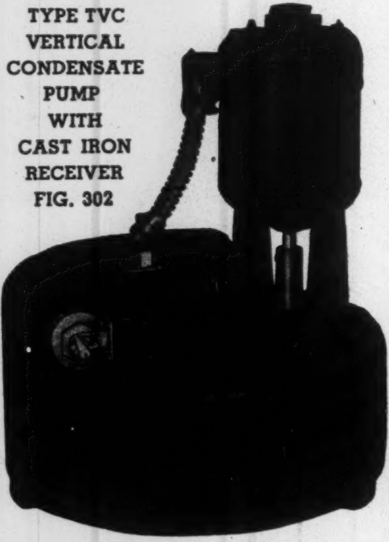
Weil Type R Pumps are available with either Single-Phase or Three-Phase Motors. Range of capacities is from 5 gal. per min. to 750 gal. per min. Heads from 15 to 250 ft.

Also standard, flexible-coupled, base-mounted, pump for same applications, described in Bulletin K R 6500.

TVC CONDENSATE PUMP

JOBBERS PLEASE TAKE NOTICE

TYPE TVC VERTICAL CONDENSATE PUMP WITH CAST IRON RECEIVER FIG. 302



These pumps provide freedom of layout because of their low return connections. Underground return lines are eliminated and lines may be placed overhead. Made in capacities of 500 to 10,000 sq. ft. E.D.R. For low pressure systems. They feature Bronze pump construction and Cast Iron Receivers. **Also secure Bulletins for WEIL'S other types.**

Horizontal type low pressure condensate pumps with steel receivers. Capacities from 2,000 to 40,000 sq. ft. of direct radiation. See Bulletin SRC 450.

Vertical Type underground condensate Pumps with either steel or cast iron receivers. Capacities from 2,000 to 100,000 sq. ft. of direct radiation. See Bulletin NRG 200.

WEIL PUMP COMPANY

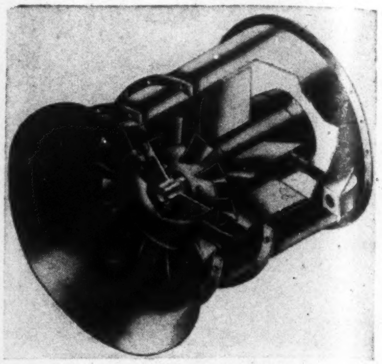
Manufacturers of Centrifugal Pumps

1523 N. Fremont Street **Chicago 22, Illinois**

(Continued from page 241)

is made with a steel or cast iron receiver and is mounted on either a steel or cast iron base.

Axial Fan Has Adjustable Blades



No. 3650—Joy Mfg. Co., Oliver Bldg., Pittsburgh 22, Pa., has announced a new line of "Axi-vane" adjustable blade fans, series 1000, for heating, ventilating, and air conditioning.

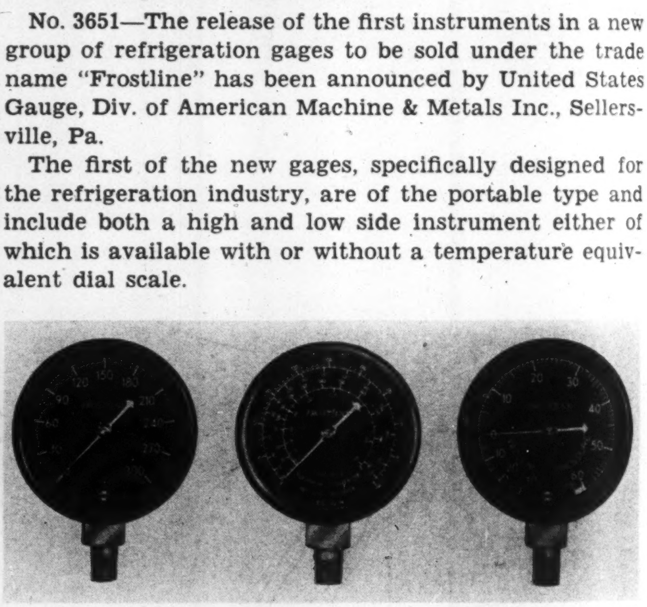
The fans are of the vaneaxial type designed for a range of pressures up to 9.6 in. water and for volumes up to 100,000 cfm. Units are available in 124 models, from various combinations of 15 different housing diameters (18 to 60 in.), four hub sizes, 16 motor frame sizes, and four different speeds.

The adjustable blades are designed to provide flexibility in performance, and the compact design with in-line drive is said to lower installation costs, minimize space requirements, and to develop maximum volume and pressure per pound of fan and motor.

New Refrigeration Gages Include High, Low Side Units

No. 3651—The release of the first instruments in a new group of refrigeration gages to be sold under the trade name "Frostline" has been announced by United States Gauge, Div. of American Machine & Metals Inc., Sellersville, Pa.

The first of the new gages, specifically designed for the refrigeration industry, are of the portable type and include both a high and low side instrument either of which is available with or without a temperature equivalent dial scale.



Design features of these new instruments include an adjustable pointer for easy recalibration, a removable screw check to prevent damage to the Bourdon spring from surges in pressure, large dials with 1 in. graduations on the low side (vacuum) gage, luminous treatment of dials and pointers for greater legibility in semi-darkness, and protection of the low side gage to 200 psi overpressure. This last feature is designed to protect against spring damage and necessary recalibration should the 60 psi upper working limit be exceeded.

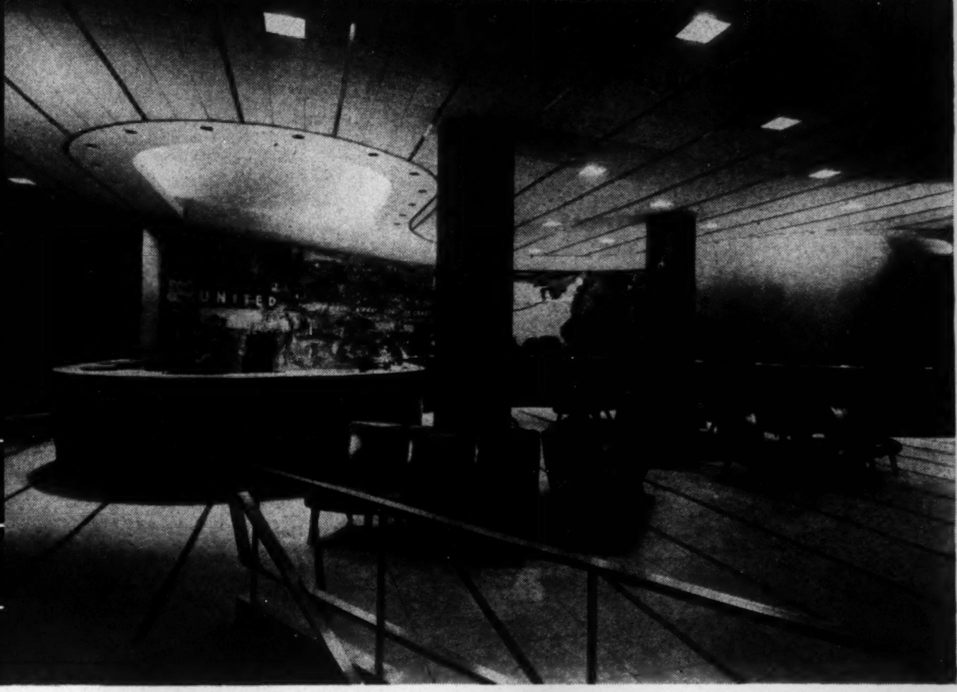
Heat, Ventilate and Air-Condition with . . .

MULTI-VENT

The Only Air Diffusion System You Can't Feel

Can't Hear

Can't See



United Air Lines Ticket Office, Chicago. Multi-Vent Panels completely concealed by metal acoustical ceiling.

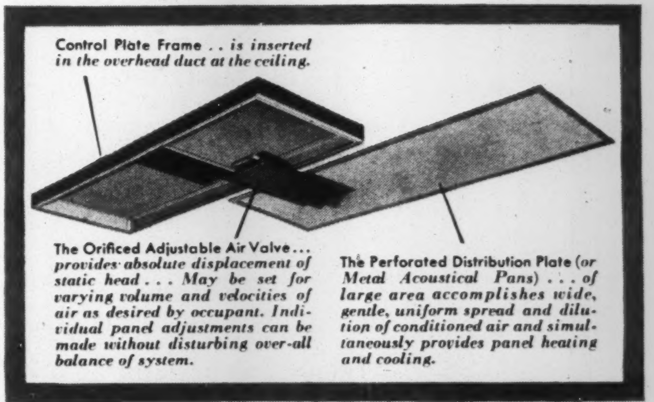
MULTI-VENT is the only air diffusion system you can't feel because *only* Multi-Vent's exclusively patented total displacement valve and large perforated distribution plate can provide the very low velocity and widespread air delivery necessary to completely eliminate drafts and the subtle, annoying sensations of draft, i. e. uneven room temperatures.

MULTI-VENT is an air diffusion system you can't hear, because Multi-Vent's recommended duct velocities and air volume requirements are so low that no audible friction noise is generated by the entering air. In addition, the sound absorption qualities of the perforated distribution plates actually reduces the noise level in any room.

MULTI-VENT is the only air diffusion system you can't see, because only Multi-Vent can be completely concealed above the square perforated pans in a *metal* acoustical ceiling. Multi-Vent panels can also be lined up with the creases in *fiber* acoustical ceilings for almost complete concealment. In all other types of installation, with exposed or concealed ducts, Multi-Vent panels are less conspicuous than diffusers of any other make.

MULTI-VENT, moreover, is by far the most *effective* and *efficient* air diffuser on the market today! Accurate tests show that Multi-Vent's low velocity air delivery makes possible the use of much higher diffusion temperature differences without affecting the room occupants' comfort. This in turn greatly reduces the air volume usually required to take care of a given load . . . thereby not only making possible substantial reductions in the tonnage of the basic air conditioning equipment, but also adding greatly to the comfort factor. The result is truly superb comfort. *No drafts . . . no sound of rushing air . . . no protruding ventilating fixtures.* Write for Bulletin for complete information and specifications.

SIMPLE TO INSTALL • QUICK TO BALANCE • EASY TO CLEAN


Control Plate Frame . . *is inserted in the overhead duct at the ceiling.*
The Orificed Adjustable Air Valve . . . *provides absolute displacement of static head . . . May be set for varying volume and velocities of air as desired by occupant. Individual panel adjustments can be made without disturbing over-all balance of system.*
The Perforated Distribution Plate (*or Metal Acoustical Pans*) . . . *of large area accomplishes wide, gentle, uniform spread and dilution of conditioned air and simultaneously provides panel heating and cooling.*

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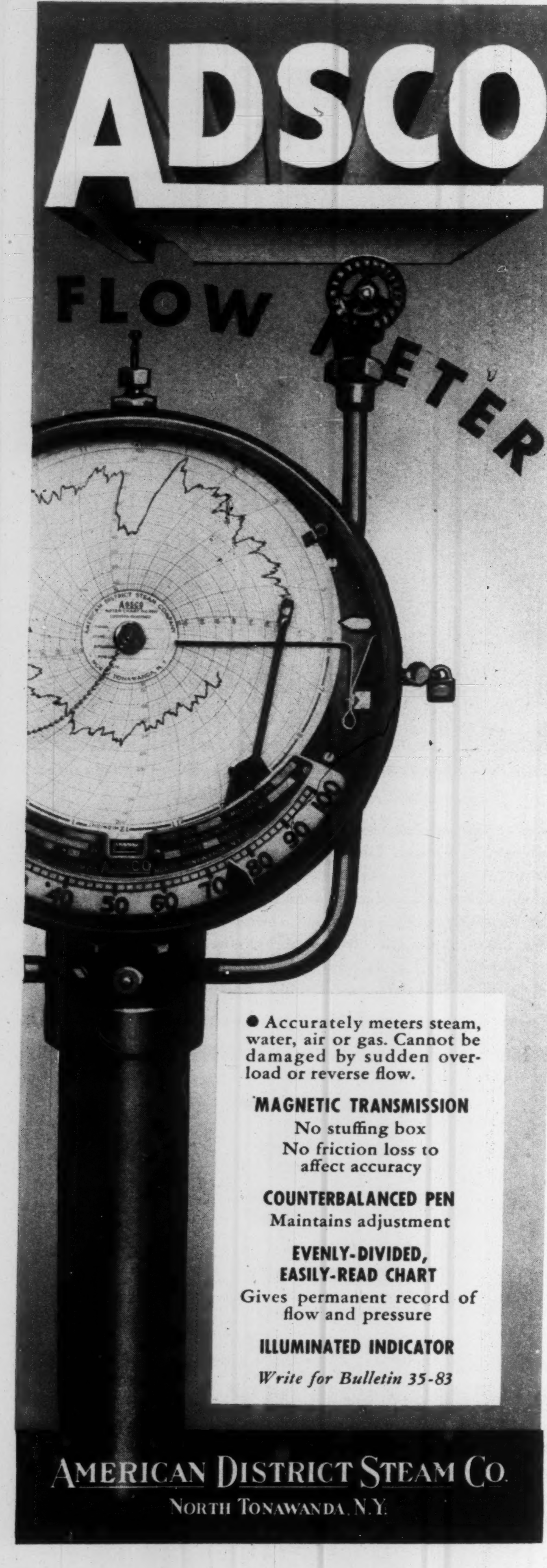


● Accurately meters steam, water, air or gas. Cannot be damaged by sudden overload or reverse flow.

MAGNETIC TRANSMISSION
No stuffing box
No friction loss to affect accuracy

COUNTERBALANCED PEN
Maintains adjustment

EVENLY-DIVIDED, EASILY-READ CHART
Gives permanent record of flow and pressure

ILLUMINATED INDICATOR

Write for Bulletin 35-83

AMERICAN DISTRICT STEAM CO.
NORTH TONAWANDA, N.Y.

Separates Metal Parts

No. 3652—An electronic instrument called the metals comparator has been introduced by the Special Products Div., General Electric Co. Schenectady 5, N. Y., for providing a quick, nondestructive comparison of either magnetic or nonmagnetic metal parts with a standard. According to the manufacturer, parts appearing alike but differing in composition can be separated quickly with the new instrument which has been used to differentiate between annealed and unannealed steel bars, and also to sort finished metal parts with different compositions or heat treatments.

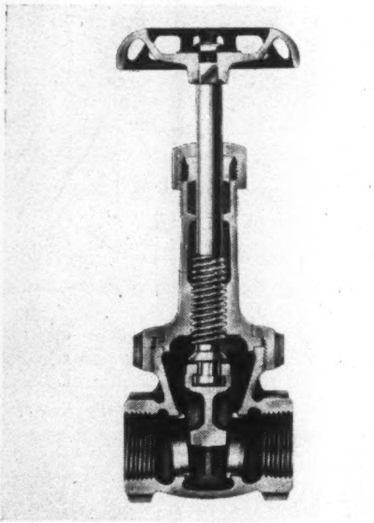
The unit employs a balancing network and indicating instrument mounted in a steel cabinet to which is connected an external test coil. In operation, a reference specimen for the group of specimens being compared is first placed in the test coil and adjustment is made to secure the initial balance. This is indicated by a zero reading on the indicating instrument. After the reference specimen has been removed, the parts to be tested are inserted briefly in the coil one by one. When tolerances have been established, specimens can be accepted or rejected on the basis of the dial reading.

Liquid Designed to Prevent Corrosion in Oil Tanks

No. 3653—"Tank Saver" is a liquid offered by Sudbury Laboratory, South Sudbury, Mass., which is designed to prevent corrosion in oil storage tanks and thereby greatly increase tank life.

The material, being heavier than water, goes to the bottom of the tank, mixes with the water in the tank (caused by condensation) and is said to form a protective film. The product is also highly alkaline, and according to the manufacturer, neutralizes any acid that may be in the oil.

Bronze Wedge, Monel Seat Rings Used in Gate Valve



No. 3654—A new bronze gate valve for 200 psi service, Fig. 270-U, has been developed by Jenkins Bros., 80 White St., New York 13, N. Y.

Principal advantage is said to be the newly designed seating combination—a high tensile strength bronze wedge seating against monel metal seat rings of a hardness about 2½ times that of valve body bronze. Seat rings are

Airfoil

AIR DIFFUSING OUTLETS

★ Features new Airfoil Louvre . . . shaped like the wing of a plane.

★ Airfoil Louvres are aerodynamically designed to handle more air at higher velocities.

★ Airfoil Grilles are custom built to meet individual requirements.

The new TMC Airfoil Grille represents the greatest advance in air diffusion design in the last 20 years. Grilles are built with two banks of Airfoil louvres assuring a positive 4-way air stream directional control. The completely new design of the TMC Airfoil Louvre enables the Airfoil grille to handle more air at higher velocities. The amazing new Airfoil grille no longer employs the use of a mullion. Elimination of the mullion and butted construction gives greater free area to each grille. The result . . . a smaller TMC Airfoil Grille which will efficiently handle more air. A standard border of 1¼″ is built on all TMC Airfoil Grilles with a rubber gasket underneath which seals grille tightly to wall preventing air leakage. Get complete data—with prices and deliveries—by writing Dept. **HP48.**

tmc

★ ★ ★

TITUS MANUFACTURING CORP. • WATERLOO, IOWA

THE AIR YOU BREATHE SHOULD BE AS PURE AS THE WATER YOU DRINK
Available Everywhere
ILG
ILG VENTILATION

Pick up your telephone—*anywhere*—and get data, prices, and delivery schedules on ILG equipment. ILG Branch Offices in principal cities, plus a national network of leading wholesalers are ready to help you with ventilating and heating problems. Send coupon or phone today.

GET CATALOG 147 on ILG Propeller Fans with exclusive, patented Self-Cooled Motor

GET BULLETIN 342 on ILG Unit Heaters with Self-Cooled Motors that never "slow-roast."

GET CATALOG 247 on complete lines of ILG Direct-Connected Centrifugal Fans (Blowers).

ILG ELECTRIC VENTILATING CO., CHICAGO 41, ILL.
2841 N. Crawford Ave. Offices in more than 40 Principal Cities
Send the following:
☐ Catalog 147 ☐ Bulletin 342 ☐ Catalog 247

Firm Name..
Individual........................Title..............
Address..................................Zone....
City.........................State...............

expanded into the body and, according to the manufacturer, are equivalent to integral faces. This combination is designed so that the wear is taken by the most accessible and inexpensive part, the bronze wedge, which can be replaced, when necessary, by slipping it off the stem and slipping on a new one.

Another feature is the thread design on the manganese bronze spindle. Threads are long and large in diameter so as to reduce wear to a minimum and to insure easy operation. Liberal dimensions of body, bonnet and bonnet ring are used to provide ruggedness to withstand rough usage, and to contain pressures beyond those for which the valve is rated. A deep stuffing box is designed to prevent leakage and to assure friction-free spindle operation.

Available in sizes ¼ to 2 in. the valve is recommended for severe conditions such as those prevailing in oil refineries, dye houses, food, rubber, and chemical plants.

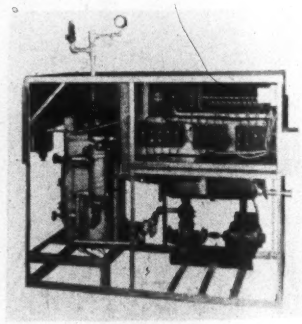
Small Size Features Room Type Conditioner

No. 3655—The new type AA "Climate Changer" has been developed by The Trane Co., La Crosse, Wis., for small sized multiple unit application in apartments, hotels, tourist courts, etc.

Like other units in the company's line, it is designed to handle any or all phases of air conditioning. Air is passed through filters, is heated or cooled and dehumidified as it is drawn through coils, and is discharged by a centrifugal fan through ducts to the conditioned space.

Chief features are said to be versatility and small size. The small horizontal unit measures 15 in. high x 30 x 32 in. and the small vertical model measures 33 in. high x 19½ x 25 in. Available in two styles and three sizes, capacities range from 190 to 910 cfm. The use of a standard water coil is recommended by the manufacturer so that hot water for heating and chilled water for cooling and dehumidifying can be handled by one piping system. Where only heating is desired, a steam coil can be specified.

Packaged Steam Generator Electrically Operated



No. 3656—The "Vap-O-Lec" steam generator is a packaged unit which is electrically operated and is offered by Cronholm Mfg. Co., 3500 S.E. Hawthorne Ave., Portland 15, Ore.

Available in capacities from ½ bhp up, it is designed for commercial and industrial processes where close control of steam pressure is needed. Seven stock sizes are available (from 6 to 11 kw) for pressures from 5 to 100 psi. Units may be operated on either single or three phase current and on either 220 or 440 volts. Steam is produced by copper sheathed generating tubes in a copper generator. Equipment furnished includes a water level control, condensate pump and tank, a solenoid valve for water make-up, together with other controls necessary for automatic operation. Units are built to ASME specifications.

A similar line of electric hot water generators is designed to provide water at temperatures from 80 to 220 F. Seven stock sizes are rated at capacities from approximately 51,000 to 205,000 Btu per hr.

Dry Ice, Acetone Used in Dew Point Indicating Unit

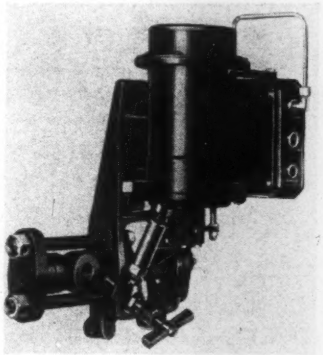
No. 3657—A dew point apparatus for measuring the moisture content of air and gases at approximately atmospheric pressure has been developed by Pittsburgh Lectrodryer Corp., P. O. Box 1766, Pittsburgh 30, Pa., manufacturer of dehumidification equipment.

Selling at less than $20.00, the apparatus consists of: (1) an outer container with inlet and outlet connections and a glass window, (2) an inner container having a highly polished outer surface visible through the window, and (3) a thermometer.

To determine the dew point temperature a small sample of the gas to be tested is passed through the outer container while a mixture of crushed dry ice and acetone is stirred in the inner container. The stirring is done with the thermometer. As the temperature drops, the polished surface of the inner compartment is closely observed through the glass window. At the first indication of dew or moisture on the polished surface of the inner container the dew point temperature is read from the thermometer.

Use of the acetone and dry ice mixture is said to make possible the quick checking of dew points as low as approximately −105 F.

Pneumatically Operated Control Valve Handles High Pressure Liquids



No. 3658—The type 530 "Gismo" micro-flow control valve is a pneumatically operated unit designed to handle minute quantities of liquids under all ranges of pressure drops up to 5000 psi. According to the manufacturer, Fisher Governor Co., Marshalltown, Iowa, it is especially suitable for use in pilot plant operations and pH control.

The unit consists primarily of a rotary stem valve turning on a lead screw. The valve stem is rotated on the lead screw by a diaphragm power piston which operates on 2 to 15 psi air pressure change from a control instrument. The rotation of the stem is a maximum of 60 deg, obtained by a 3¾ in. diaphragm power cylinder stroke. A valve power positioner is used to obtain accuracy of stem position for proper throttling. Pipe connections are ¼, ⅜, or ½ in.

Metal Foil Used on Insulated Pipe Unit

No. 3659—The Ric-wiL Co., 1562 Union Commerce Bldg., Cleveland 14, Ohio, manufacturer of insulated pipe conduit systems, has announced a new insulated pipe unit, called "Foilclad", for outdoor overhead applications.

According to the company, pipe units are specifically designed for the protection of steam, hot water, and

for
- SPRAYING
- WASHING
- RINSING
- COOLING
- AIR CONDITIONING

YARWAY

SPRAY NOZZLES

INVOLUTE-TYPE FOR HOLLOW CONE SPRAY
FAN-TYPE FOR FLAT SLICING SPRAY

Get the most out of your Spraying Equipment with minimum power . . . with efficient spraying.

Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute-type producing a fine hollow spray with minimum energy loss, and Yarway Fan-type producing a flat fan-shaped spray with time-saving slicing action for cleaning.

Wide range of standard sizes and capacities. Cast or machined from solid bar stock.

Thousands in use. Write for new Bulletin N-616.

YARNALL-WARING COMPANY
107 Mermaid Avenue Philadelphia 18, Pa.

brine distribution lines. Pipe, as specified, is covered with loose fitting asbestos pipe covering to any desired thickness. This insulation is then machine coated with high temperature asphalt and wrapped with asbestos felt, followed by an additional coating of asphalt. As a final operation, the outside is wrapped with a sheet of thin electrolytic copper or aluminum, as desired. This is said to make an excellent bond with the hot asphalt.

Furnished to meet any specification as to the kind of joint, pipe units are delivered to the job in 21 ft lengths, eliminating the field work of insulating, waterproofing, etc. Galvanized iron sleeves, wedge clips, expansion loops, fittings, etc. are also available.

Air Diffuser Designed to Provide Adjustable Flow Pattern

No. 3660—A new type air diffuser has been announced by the Anemostat Corp. of America, 10 E. 39th St., New York City, which is designed to provide any desired air flow pattern at the turn of a knob. An adjustment mechanism varies the vertical position of the third cone. This is said to give different air flow patterns ranging from maximum diffusion to downward projection, without appreciably affecting air resistance.

This device utilizes the company's aspiration principle which draws room air into the unit and mixes it with supply air. The amount of air drawn into the outlet depends upon the adjustment setting and varies from 15 to 35 percent.

This adjustable feature is said to permit the type C-1 "Anemostat" to be used for heating, ventilating, or cooling in any combination. The air flow pattern, says the manufacturer, may be modified to meet changing conditions of room occupancy or seasonal weather variations, as well as to neutralize the effect of local sources of heat gain or loss, etc.

Adjustment of the device can also be accomplished by remote automatic or manual control. Pneumatically operated control equipment may be used to adjust any number of units simultaneously. A new method of fastening the inner assembly to the outer cone is designed to save two-thirds of installation time, and since the inner cone assembly is readily removable, direct cfm readings can readily be taken in the neck of the unit. According to the company, this greatly reduces the time required to balance the system.

Develops Plastic Lined Pipe for Corrosive Materials

No. 3661—Saran Lined Pipe Co., Stephenson Bldg., Detroit, Mich., a newly organized firm, will act as exclusive distributors for the Dow Chemical Co.'s recently developed specialty pipe and fittings which are lined with a plastic called "Saran" and which were developed for use where highly corrosive materials are handled.

Chemical resistance, ease of fabrication, immediate delivery, and reasonable cost are said to be some of the

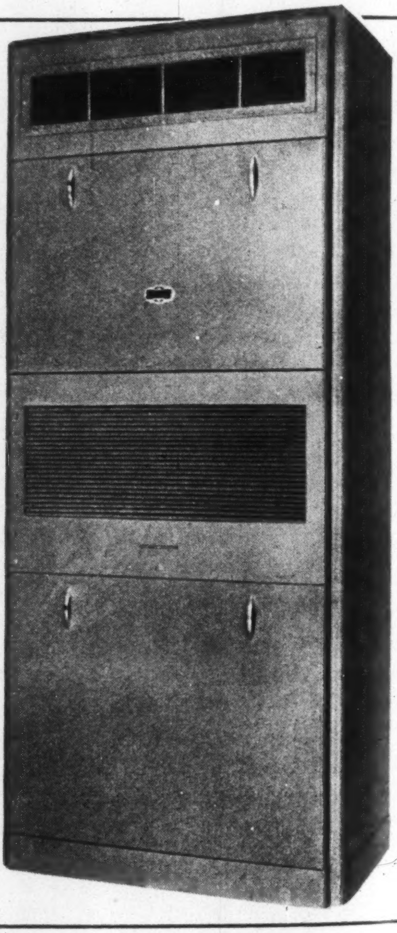
AIR CONDITIONING...

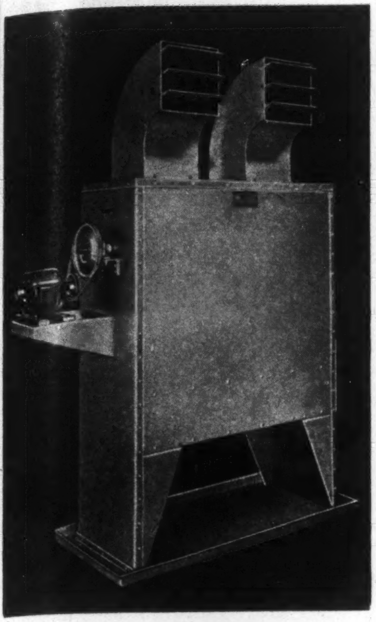
A necessity to mankind! It assures the comfort of people in hospitals, homes, stores, offices, mills and factories. Increased comfort means better health and this contributes to a happier and more efficient population.

Air Conditioning is essential to our way of life . . . we must increase our efforts toward that end.

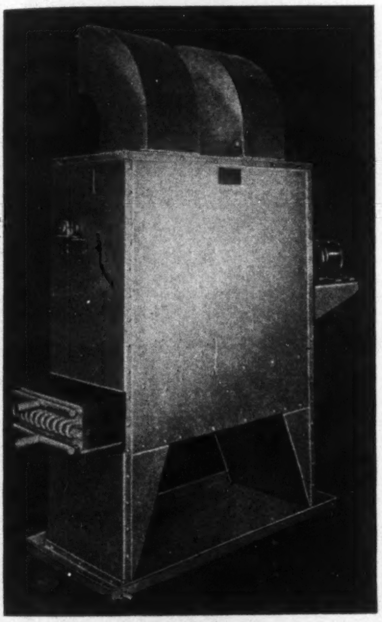
NEVINGER MANUFACTURING CO., INC.

GREENVILLE ILLINOIS





▲ FLOOR TYPE
▲ COOLING UNIT



▲ FAN AND COOLING
▲ COIL ASSEMBLY

Skinner

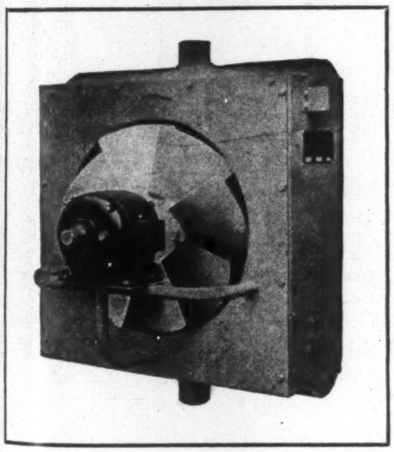
UNIT HEATERS

"Quality First" . . . ALL-STEEL COILS Since 1914

Since 1914 Skinner has been building and supplying Unit heaters with all-steel coils for the toughest and most exacting heating installations. That's an assignment that takes real engineering ingenuity and product performance in order to fill the bill and stay out in front of the unit heater field. You'll never be sorry you specified Skinner. They operate at top efficiency and with surprising economy year after year and have been chosen time and time again by responsible users because of their reliability under any and all conditions. So, naturally you'll insure better performance on your installations by specifying Skinner Unit Heaters whenever the job must have unfailing, economical heat.

We have more information at the office . . . why not write for it? A postcard is sufficient.

SKINNER HEATING and VENTILATING CO., Inc.
Division of
ST. LOUIS BLOW PIPE AND HEATER CO., INC.
1948 North 9th Street, St. Louis 6, Missouri
Manufacturers of Heating, Ventilating and Air Conditioning Equipment



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SUSPENSION TYPE
UNIT HEATER

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FLOOR TYPE
UNIT HEATER

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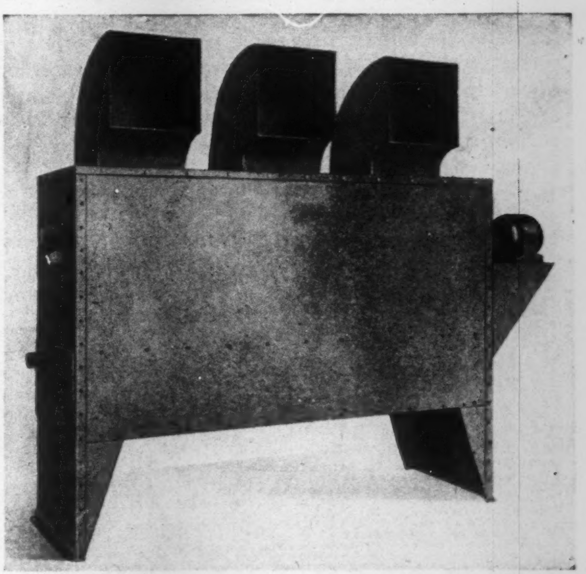
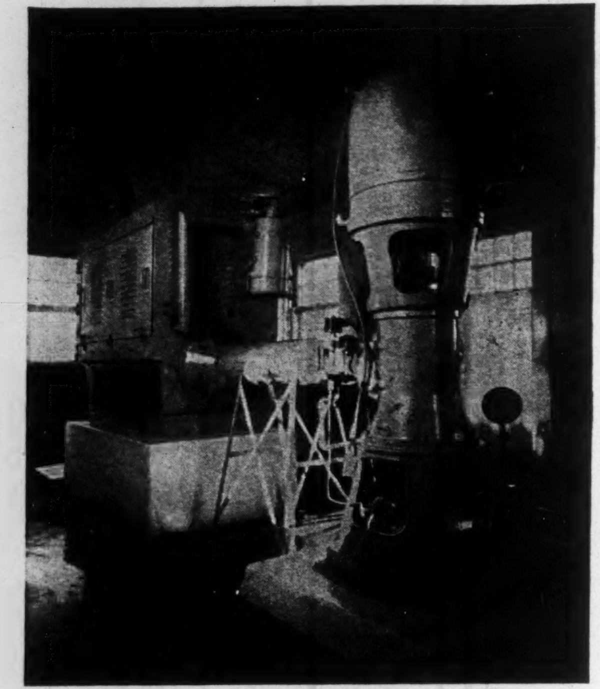




IN CASE OF Power FAILURE

The city of Margate, New Jersey no longer worries about an unforeseen powerline failure. Their newly installed million gallon per day Layne Well Water System is DUAL POWERED. Should the power fail and the electric motor "go dead" a big husky gasoline engine takes over to keep up water production.

Margate's new dual powered water system is a quality installation throughout with the very latest Layne developed control and engineering features. And like two other Layne installations for Margate—one of which is over 23 years old, this new unit will also give years and years of satisfactory operation.

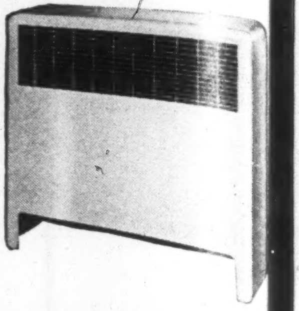
Layne Well Water Systems whether installed for cities, factories, railroads, irrigation projects or other use, keep water production at the very lowest cost. Furthemore Layne associated companies constantly provide prompt repair and parts service for their Layne installation. For late catalogs, address Layne & Bowler, Inc., General Office, Memphis 8, Tennessee.

LAYNE WELL WATER Systems

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. ★ Layne-Atlantic Co., Norfolk, Va. ★ Layne-Central Co., Memphis, Tenn. ★ Layne-Northern Co., Mishawaka, Ind. ★ Layne-Louisiana Co., Lake Charles, La. ★ Louisiana Well Co., Monroe, La. ★ Layne-New York Co., New York City ★ Layne-Northwest Co., Milwaukee, Wis. ★ Layne-Ohio Co., Columbus, Ohio ★ Layne-Pacific, Inc., Seattle, Washington ★ Layne-Texas Co., Houston, Texas ★ Layne-Western Co., Kansas City, Mo. ★ Layne-Minnesota Co., Minneapolis, Minnesota ★ International Water Supply Ltd., London, Ontario, Canada ★ Layne-Hispano Americana, S. A., Mexico, D. F.

chief advantages of the pipe and fittings which are now in production. According to the distributor, sales representatives and jobber outlets will be established throughout the country.

Adds Nonferrous Convectors To Line of Heating Equipment

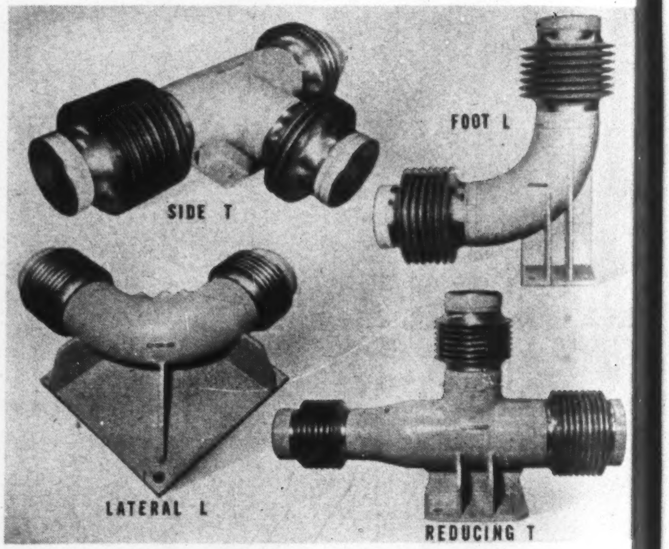


No. 3662—Airtherm Mfg. Co., 700-C S. Spring Ave., St. Louis 10, Mo., manufacturer of direct-fired heaters and steam unit heaters, has announced a new line of convector radiators for hot water and steam heating systems.

Units are available in three types: a unit for free standing or partially recessed installations, a regular wall cabinet, and a sloping top wall cabinet. They are constructed with seamless copper tubes brazed into copper alloy headers, and the nonferrous fins are mechanically bonded to the tubes. All edges and corners of the front panel are formed to a 1 in. radius.

Anchor Base Used on Expansion Joint Pipe Fittings

No. 3663—The addition of a new line of anchor base expansion joint pipe fittings to its six standard series of packless expansion joints has been announced by MagniLastic Div., Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.



The four typical units shown here are all of stainless steel. In the side tee the number of bellows flanges may be varied to accomodate unequal expansion in each leg. Each of these fittings stems from the company's No. 40 series and is constructed for steam lines.

This new line will supplement the company's regular expansion joints which are made for a full range of pressures from 30 in. vacuum to 1000 psi in pipe sizes from ½ to 72 in. Greater pressures and special pipe sizes can be handled on special order.

Question:

How can you really profit from oil burner sales?

PETRO

REG. U.S. PAT. OFF.

OIL BURNERS • BOILER-BURNER UNITS
FURNACE-BURNER UNITS • WATER HEATERS

Answer:

Take it from experienced heating contractors — the *sure* way is to handle the *right* oil burner . . . that

. . . bears the stamp of quality through and through
. . . assures customer satisfaction by performance-proven dependability
. . . features exclusive oil-saving, low-upkeep advantages users want
. . . helps strengthen your reputation for selling fine equipment
. . . has over 40 years' experience built into it by the world's largest, oldest exclusive maker of oil-fired equipment
. . . gets vigorous promotion month after month through national advertising to *your* prospects.

In a word--PETRO! With Petro you *can* really profit from every oil burner sale. Find out more about the *complete* Petro line—including oil burners, boiler-burner units, furnace-burner units, water heaters. Talk it over with the established heating and plumbing jobber who handles Petro in *your* wholesale trading area.

PETROLEUM HEAT AND POWER COMPANY • STAMFORD, CONNECTICUT
Makers of Good Oil Burning Equipment Since 1903

REFINERIES . . . FUEL OIL STORAGE AND DISTRIBUTION TERMINALS . . .
NATIONWIDE OIL BURNER SALES AND SERVICE FACILITIES

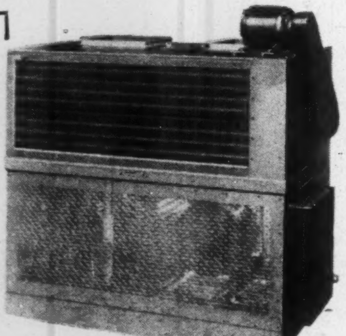
Why YOU Should Sell THE GR AIR CONDITIONING LINE . . .

IT'S COMPLETE . . . with a size and type for every requirement in theaters, hotels, factories, offices, shops, laboratories, etc.

IT'S WELL ENGINEERED . . . For thirty years the General Refrigeration name has been recognized for dependability wherever air conditioning is used.

IT'S PROFITABLE . . . The complete, well-engineered line puts you in an excellent competitive position. General Refrigeration's reputation for dependability builds customer acceptance, makes sales easier.

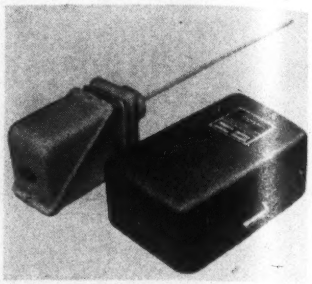
AN UNUSUAL OPPORTUNITY AWAITS YOU if your territory is still open . . . and if you have the necessary sales and service facilities. Write for more details on the G-R Air Conditioning line and ask about our profitable dealer sales and service plan.



This 10-hp. self-contained unit air conditioner, is a new addition to the General Refrigeration line.

GENERAL REFRIGERATION
DIVISION
YATES-AMERICAN MACHINE CO., Beloit, Wisconsin

Control Safeguards Against Gas Flame Failure

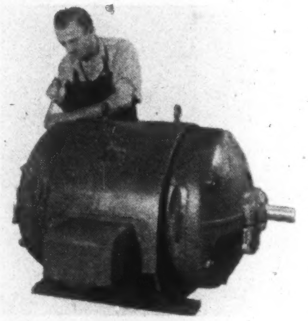


No. 3664 — Combustion Control Corp., 77 Broadway, Cambridge 42, Mass., has introduced its latest "Fireye" flame failure safeguard for industrial gas oven, kiln, and boiler protection, together with all types of gas-fired burners.

Flame rod type 45JQ1 is used with the company's programming control, type 24PJ8, for fully automatic burners. It is used with control type 24QJ5 when only operating protection is required. Various combinations of auxiliary exhaust fan timers and relays are also supplied to meet particular oven requirements.

The unit is an electronic device which is said to "feel" the gas flame so that when flame fails, it instantly cuts off fuel. It can be wired to sound an alarm automatically.

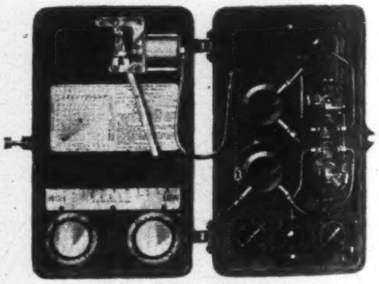
High Speed Motor Features Two Pole Construction



No. 3665 — A two pole squirrel cage induction motor has been added to the "Heavy Duty" line of Electric Machinery Mfg. Co., 821 2nd Ave., S.E., Minneapolis 14, Minn.

Rated from 200 to 700 hp at 3600 rpm, the motor is said to be especially suitable for such high speed applications as boiler feed pumps, oil pipe line pumps, centrifugal pumps, compressors, and blowers. Features include NEMA Class B starting, dripproof construction, fabricated steel frame, and centrifugally cast bearing sleeves.

Dual Pilot Unit Indicates or Records and Controls Liquid Levels



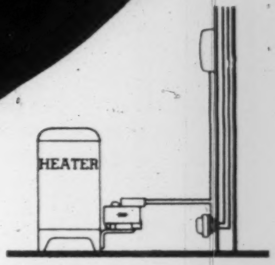
No. 3666 — The new No. 2406-248 "Level-Trol" is a dual pilot, displacement type unit for indicating or recording and controlling liquid levels. The manufacturer is Fisher Governor Co., Marshalltown, Iowa.

The unit has two distinct pilot circuits so that the indicator portion can be set to indicate or record the level over the full float range and can then be locked in position. The control function is handled by the second pilot which may be adjusted without disturbing the indication or recording of the liquid level. A scale in the case door provides visual indication of the level within the vessel. This scale is operated pneumatically by the level indicator pilot only. Both pilots are operated by one float and torque tube measuring system.

HERE'S $7500.00 * IN EXTRA SALES FOR YOU!

ELECTRIC
AUTO-HEAT UNIT
12 VOLTS
7 WATTS
PRODUCTS COMPANY

ALL your Oil Heater Customers will welcome these Oil Control Accessories

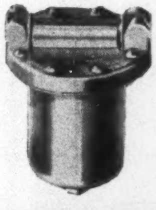


A-P Model 240-ED Heat Regulator Set. Inexpensive, easy to install.

A-P Heat Regulator Set for Vaporizing Burning Space Heaters

Here is THERMOSTATIC Temperature Control that will save oil, provide greater comfort, greater convenience wherever a Vaporizing Burner Oil Heater is used. You can install it on new heaters as well as those made as far back as 1939 — all using the A-P Model 240-DR, UR or YR Manual Controls. That means a *long prospect list* and a chance to call on old heater customers—with profit.

Complete "Sales Package" includes an Electric "Auto-Heat" Conversion Top that mounts on the present manual control, a sensitive and accurate Wall Thermostat, a Transformer, and all accessories for quick and easy installation.



A-P Fuel Oil "TRAPIT" Traps Impurities in Oil

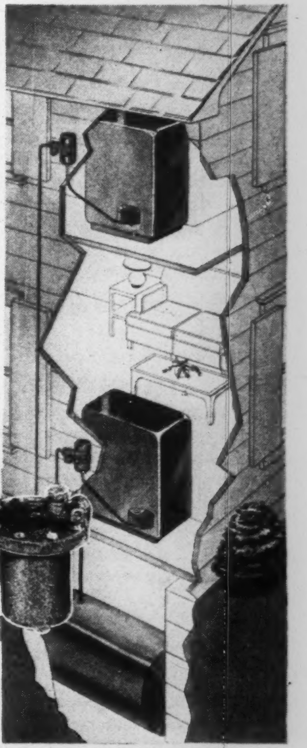
Efficiency of any oil burning appliance will be definitely improved with this A-P Fuel Oil TRAPIT. Keeps troublesome impurities out of the oil to avoid many causes of service calls. Capacity, up to 3 gallons per hour.

*Estimated Accessory Sales per dealer based on past sales.

A-P OILIFTER . . . Moves Oil from bulk tank to burner Automatically.

The OILIFTER attached to ANY vaporizing burner appliance — heater, range, water heater, furnace — ENDS OIL HANDLING IN THE HOME. Avoids oil carrying, spilling, wasting by old-fashioned "bucketing". Lifts oil to third story or 100 feet horizontally. Capacity, 1¼ gallons per hour sufficient for one or more appliances. Ideal for homes, tourist camps, stores, schools, churches, halls. Easy to install — requires only single ¼" tubing.

A-P OILIFTER with integral Filter unit.



CASH IN NOW on this rich Accessory Market! Write today for complete sales material on A-P Oil Control Accessories.

LOOK for the A-P DEPENDABLE Oil Control Valve on ALL the appliances you handle. It means easier sales, customer satisfaction and extra accessory profits.

AUTOMATIC PRODUCTS COMPANY
2460 North Thirty-Second Street, Milwaukee 10, Wisconsin

DEPENDABLE OIL CONTROLS
DESIGNED TO ELIMINATE SERVICING

Plan
HEAT TRANSFER
with REMPE

Our Long Experience at Your Service

HEAT TRANSFER EQUIPMENT
REMPE CO.
Founded 1890

ENGINEERED and BUILT for EFFICIENT DEPENDABLE PERFORMANCE

The Rempe "HOT SPOT" Fuel Oil Preheater

This efficient heater is available in 16" or 14" diameter size, and for use with hot water or steam. For use in oil storage tanks up to 12 feet diameter.
List Price $87.50

Write for full descriptive data

Rempe Fin Coils for Heating or Cooling Application

Fin Coils designed by Rempe always carry their heat load with ease because they are never overrated. Made for any refrigerant, cold water, hot water or steam. For any temperature between minus 60° to plus 350° F.

Send us your special problems.

Rempe Pipe Coils for all Process Work

Rempe has been making pipe coils for 57 years. Any diameter or any length, to your specifications or our design. Can be supplied in any Steel, Alloy, Stainless Steel, Copper or Aluminum.

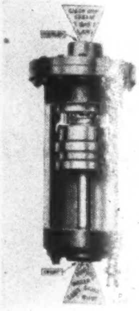
Send full details for engineering assistance or quotation.

The Rempe Engineering Data Book

Complete Engineering data for design of Pipe Coils or Fin Coils. All Heat Transfer Coefficients. Most essential to the Engineer's library. Per copy $1.50 postpaid.

REMPE COMPANY
342 N. SACRAMENTO BLVD. • CHICAGO 12, ILLINOIS

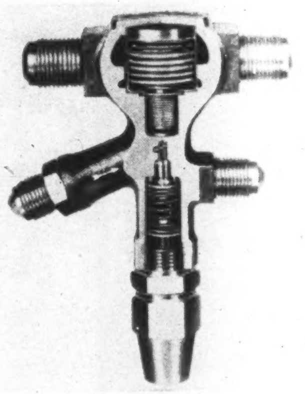
Separator Handles Steam, Gas, and Air



No. 3667—The Chicago Manufacturing & Distributing Co., 1928 W. 46th St., Chicago 9, Ill., has announced the new model E separator for delivering clean, dry steam, gas, and air.

There are no moving parts, and the separators are mechanical in operation, requiring no attention other than draining off condensation that accumulates in the chamber. Noncorrosive metals are used throughout. The unit has a maximum rated capacity of 250 cfm.

Relocates Connections on Thermostatic Expansion Valve



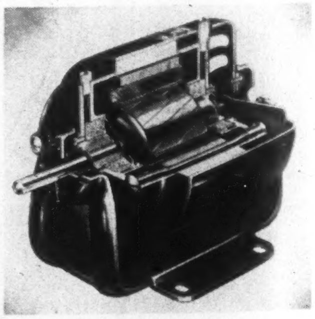
No. 3668 — An improved thermostatic expansion valve for refrigeration applications has been announced by Tenney Engineering, Inc., 26 Avenue B, Newark 5, N. J.

Where previously this type of valve was constructed with the suction and liquid connections at right angles to each other, all connections are now in the same plane. This new construction is said to be especially valuable when making connections in a confined space.

It is stated that neither the size nor the functional characteristics of the valve have been changed, and it can be furnished with a check valve incorporated in the regular size body to prevent back pressure and bleeding suction vapor from a high temperature evaporator to a low temperature evaporator when both are connected to one suction line.

The manufacturer states that response is virtually instantaneous to changes in suction vapor conditions and operation of the valve is not affected by box temperature, entering warm air, or warm suction lines. Maximum valve capacity is 1½ tons.

Improves Shaded Pole Motor for Fractional HP Use



No. 3669 — An improved four pole, shaded pole "Micromotor" in sizes from 1/100 to 1/25 hp is now available from Redmond Co., Inc., Owosso, Mich.

Designated as type T, it has a three piece, die cast frame with a steel outer shell. Other features are said to include a flush weld rotor with every slot copper filled flush with the surface, oil resistant windings, large porous bronze bearings, and large capacity oil reservoirs. The motor is cradled in rubber cushions and has a heavy gage pressed steel base.

STERLING, INC.

SALES REPRESENTATIVES IN PRINCIPAL CITIES

3732 NO. HOLTON STREET MILWAUKEE 12, WISCONSIN

Sterlco

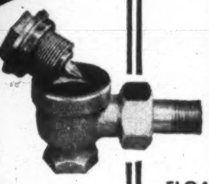
Steam Heating and Temperature Control Products

A QUARTER CENTURY of
Experience • Service
• Dependability •

STERLCO products are backed by over thirty years of experience in the design and manufacture of heating equipment.

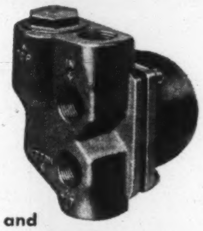
They are built at Sterling's modern Milwaukee factory, where all fabricating, assembly and testing operations are done under one roof. Every step of the manufacture of STERLCO products is done by men experienced in this type of work under the closest of supervisory and quality control methods.

Sterlco SPECIALTIES



THERMOSTATIC TRAPS

Keep radiators clear of condensate and air, prevent steam waste. Dependable bellows thermostat, sturdy brass bodies and covers, replaceable seats. Sizes: ½'', ¾'' 1''. Max. Pressures: 15, 65, 100, 125 psi. Body styles: Angle, Straightway, Corner, Vertical.



FLOAT and THERMOSTATIC TRAPS—Compact, rugged, easy to service. Bellows thermostat vents air, float valve has plenty of capacity for large amounts of condensate. Ideal for unit heaters. Sizes: ¾'', 1'', 1¼'', 1½'', 2''. Max. Pressures: 20, 100 psi.

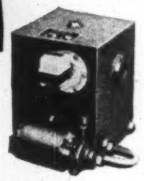
STRAINERS

"Y" type — readily cleaned without disturbing piping. Ample capacity for accumulated dirt and scale. Pressures to 125 psi. Cast iron—mostly used to protect steam traps, controls; sizes ½'' to 2''. Brass — smaller, especially light and compact; sizes ⅜'' to 2''.

VACUUM FLOAT VENTS

Vent air freely, maintain vacuum. Thermostatic unit closes positively against steam, float closes against water. Capacity for systems up to 8000 sq. ft. E.D.R., ¾'' size only. Max. Pressures: steam, 15 psi; water, 30 psi.

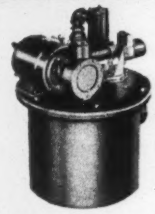
Sterlco PUMPS



3800 Series

CONDENSATION PUMPS

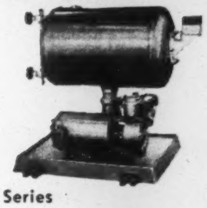
Compact, economical, dependable. Steel tanks, integrally mounted pump and motor units. Capacities: 1000 to 10,000 sq. ft. E.D.R., 1.5 to 15 gpm. Pressures: 20 and 30 psi.



3700 Series

CONDENSATION PUMPS

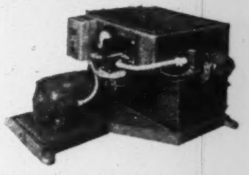
Pump and motor units on top of cast iron tanks. For installation below floor level. Capacities: 2000 to 20,000 sq. ft. E.D.R., 3 to 30 gpm. Pressures: 20 and 30 psi.



3500 Series

CONDENSATION PUMPS

Heavy duty units. Cylindrical steel tanks, steel or cast iron bases. Capacities: 2000 to 65,000 sq. ft. E.D.R., 3 to 97 gpm. Pressures: 20 to 150 psi.



VACUUM PUMPS

Simple, compact, designed for long service without loss of efficiency. Venturi type vacuum producers, automatic discharge valves. Capacities: 2500 to 40,000 sq. ft. E.D.R. Discharge Pressures: 20 to 40 psi.

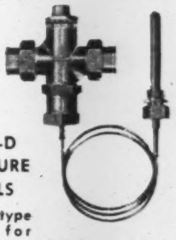
Sterlco CONTROLS

THERMOTROLS

Self-contained individual radiator temperature controls for steam or hot water. Simple to install! Eliminate overheating, save fuel. Maintain even temperature for comfort and health. Sizes: ½'', ¾'', 1''. Body styles: Angle, Straightway, Corner.

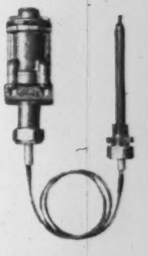
No. 117-HA TEMPERATURE CONTROLS

Self-powered modulating control valves. Respond to temperature drops of 1° or less. Provide quick action and close, dependable regulation. Max. pressure: 125 psi. Sizes 1¼'', 1½'', 2''.



No. 150-D TEMPERATURE CONTROLS

A distinct type of control, for the same type of jobs as the 117-HA but for smaller capacities. Widely used on fluid heaters, processing equipment, etc. Max. Pressure 100 psi. Sizes: ½'', ¾'', 1''.



No. 50 TEMPERATURE CONTROLS

For jobs where compactness is important. Dependable and sensitive, but economical because not merely an adaption of larger controls. Max. Pressure: 125 psi. Size: ⅜'' only.

Other STERLCO Products *RADIATOR VALVES* — spring packed, quick opening, ½'' to 1'' sizes, angle and straightway bodies. *QUICK VENTS* — thermostatic only, close against steam but not water. *BOILER RETURN TRAPS* — 4000 sq. ft. E.D.R. max. capacity.

STERLCO Products are engineered for efficiency and designed for dependability . . . with a background of a quarter of a century experience in the field. All STERLCO Products are distributed through leading Plumbing and Heating Wholesalers.

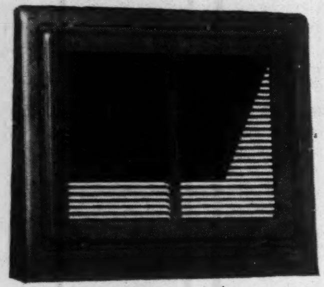
QUICK DELIVERY

STANDFORATED
PERFORATION OF ALL METALS

QUALITY PRODUCTS

FOR HEATING and AIR CONDITIONING...

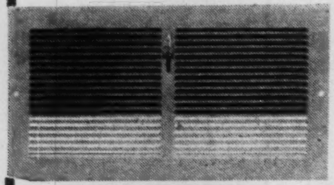
GRAVITY BASEBOARD REGISTERS with REMOVABLE "BEND-EZY" FACE METALLIC FINISH



Available Now in These Specifications:

Duct Size	Base Ext.	Overall Width	Overall Height
10" x 8"	2¼"	13⅛"	11⅞"
12" x 8"	2¼"	15⅛"	11⅞"
12" x 9"	3¼"	15⅛"	12⅞"

OTHER SIZES MADE TO ORDER



"Bend-Ezy" FORCED AIR

REGISTERS and GRILLES
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IMMEDIATE SHIPMENT
on the Following Sizes:
8 x 6 12 x 6
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Can also supply 24 x 6 and 30 x 6 Intakes to match. Quick delivery on other size registers and intakes.

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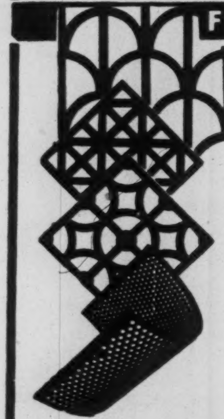

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We also manufacture the MIRRO-GLO Line of Bathroom Medicine Cabinets

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3151 W. 49th PLACE · CHICAGO, ILLINOIS

Relief Valve Used With Mineral Oil Systems

No. 3670—A new relief valve specially designed for industrial uses with mineral oil systems has been brought out by Electrol, Inc., 85 Grand St., Kingston, N. Y.

This relief valve, which can be adapted to use with water in special cases, features a dampening device consisting of a close fitted piston working in oil, designed to prevent squealing or chattering. The range between cracking pressure and full flow can be kept very small, says the manufacturer, with cracking pressure reaching 90 percent of full flow pressure. Likewise, the spread between full flow and reseating pressure can be kept small, with reseating pressure reaching as high as 85 percent of full flow pressure.

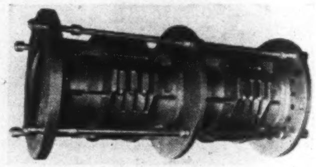
The valve is available in two models. Model 523-8 is designed for 500 to 2100 psi; its maximum flow is 6 gpm. Model 523-14 has a pressure range also from 500 to 2100 psi; its maximum flow is 16 gpm.

Treats Fuel Oil to Remove Soot and Sludge

No. 3671—A chemical solution for treating fuel oil to remove soot and sludge has been developed by Elraco Engineering Co., 732 W 58th St., Los Angeles 37, Calif.

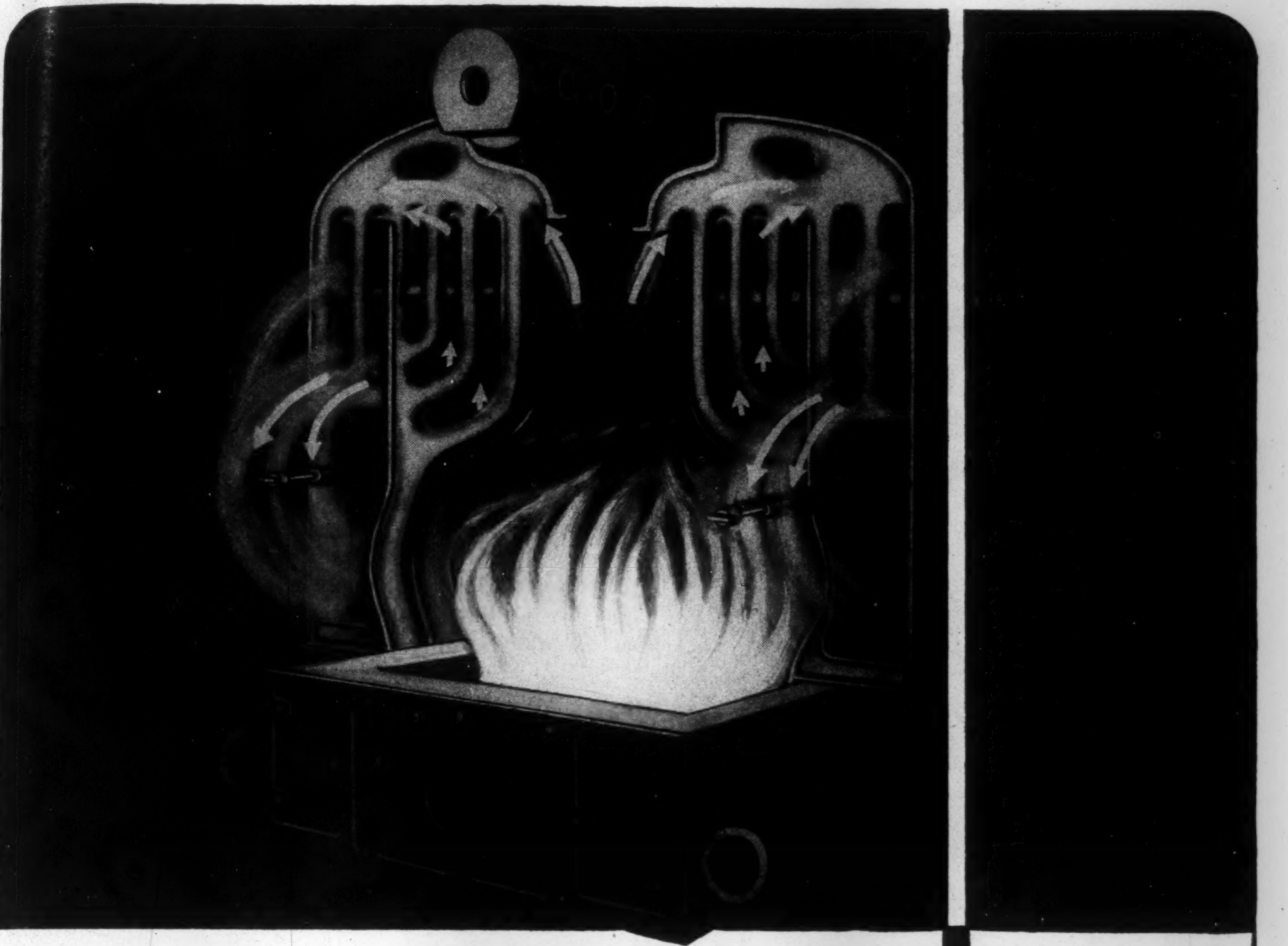
Added to fuel oil in the ratio of 1 qt to 1000 gal of fuel oil, it is said to dissolve sludge and emulsify water and oil so that water and sludge are consumed as the fuel is burned. Continued use, says the manufacturer, "eliminates all manual sludge removal, and soot is reduced to fine carbon particles which are generally carried away with the products of combustion or removed by brushing or blowing." The treatment is said to be harmless to metals.

Expansion Joint Absorbs Movement of High Temperature Lines



No. 3672—Zallea Brothers & Johnson, 888 Locust St., Wilmington 99, Del., has announced production of a new line of universal expansion joints especially designed for use in refineries, power plants, and chemical process plants. The joint is said to be capable of absorbing movement of high temperature lines in any direction—axially, laterally, angularly, or any combination of these.

Essentially, it consists of two corrugated elements linked together by a section of pipe. The amount of lateral movement that can be absorbed depends on the length of pipe between the corrugated elements. The expansion elements can be either of the nonequalizing type for pressures up to 30 psi or of the self equalizing type for higher pressures.

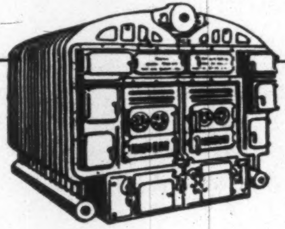


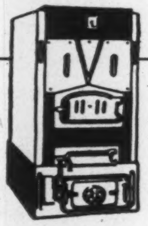
How many boilers do *you* see?

The nine-section Mills 44 boiler illustrated above is actually 18 boilers, guaranteeing you 18 times as much security as any other type boiler. If, for any reason, a section becomes disabled, 17 other boilers continue to function, without interruption!

Why so? Header type construction makes each section a separate boiler — *each* receives returns uniformly from return drums and *each* discharges to a steam drum. A cracked section can be temporarily blocked off by simply cutting its supply and return nipples and plugging the drums. The replacing section can then be installed when convenient.

There's a place for Smith-Mills boilers wherever *continual, uninterrupted, economical* heating is necessary. Other unique and exclusive advantages of Smith-Mills boilers are described thoroughly in the H. B. Smith Catalog . . . write for it.

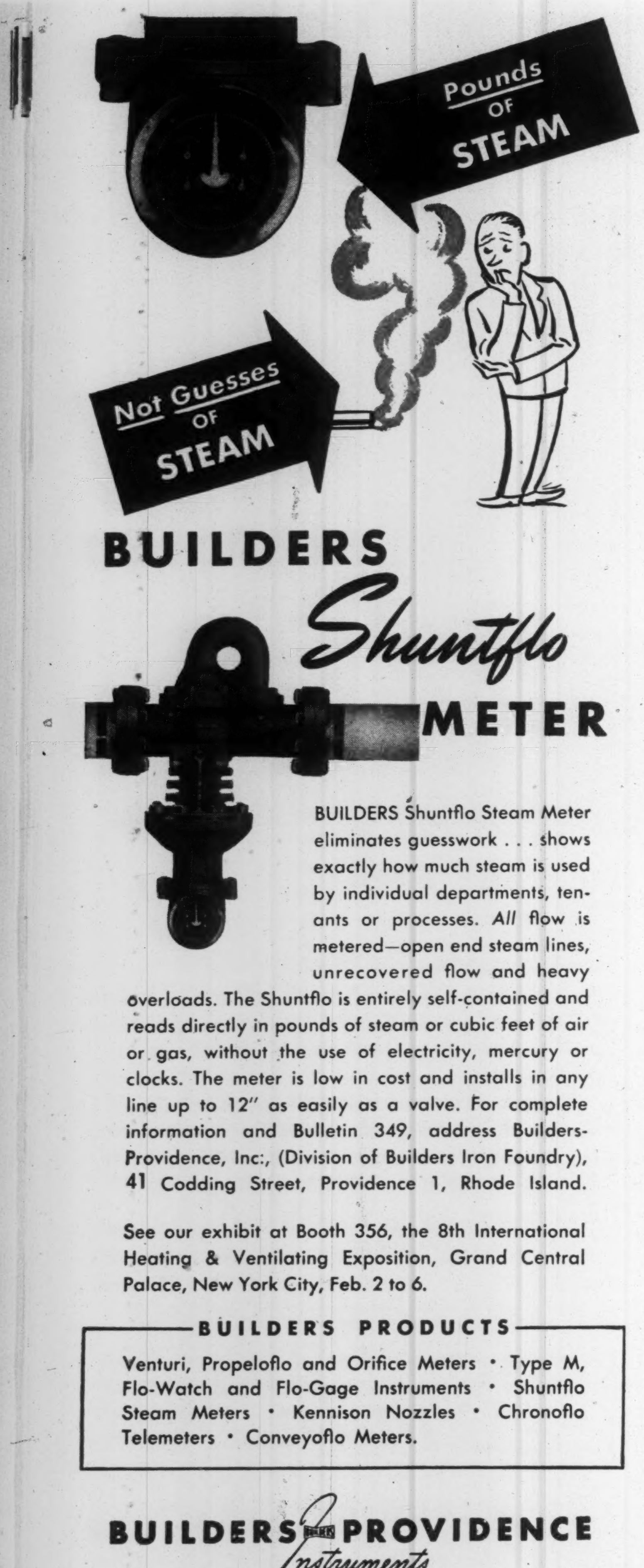




H.B. Smith

CAST-IRON BOILERS

THE H. B. SMITH CO., INC., 61 Main Street, Westfield, Mass. Offices and Representatives in Principal Cities



BUILDERS Shuntflo METER

BUILDERS Shuntflo Steam Meter eliminates guesswork . . . shows exactly how much steam is used by individual departments, tenants or processes. *All* flow is metered—open end steam lines, unrecovered flow and heavy overloads. The Shuntflo is entirely self-contained and reads directly in pounds of steam or cubic feet of air or gas, without the use of electricity, mercury or clocks. The meter is low in cost and installs in any line up to 12" as easily as a valve. For complete information and Bulletin 349, address Builders-Providence, Inc., (Division of Builders Iron Foundry), 41 Codding Street, Providence 1, Rhode Island.

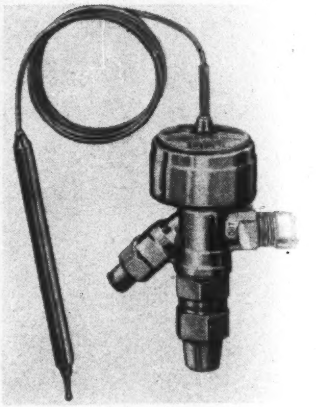
See our exhibit at Booth 356, the 8th International Heating & Ventilating Exposition, Grand Central Palace, New York City, Feb. 2 to 6.

BUILDERS PRODUCTS

Venturi, Propeloflo and Orifice Meters • Type M, Flo-Watch and Flo-Gage Instruments • Shuntflo Steam Meters • Kennison Nozzles • Chronoflo Telemeters • Conveyoflo Meters.

BUILDERS-PROVIDENCE
Instruments

Expansion Valves Have Pressure Limiting Feature



No. 3673 — Automatic Products Co., 2450 N. 32nd St., Milwaukee 10, Wis., has announced two new additions to its series of thermostatic expansion valves. Models 211 and 212 are designed for use where a pressure limiting feature is desirable to avoid possible difficulty caused by motor overloading at sharp peak loads or during pull-down.

The valves use only one spring and one needle. A new diaphragm unit limits the operating suction pressure to a predetermined setting and the valves operate in the normal manner to control superheat through the thermostatic bulb and diaphragm. Liquid cross charged, they may be mounted in any position or ambient temperature.

Capacities of both models are ½, 1, and 1½ tons "Freon"; ½, 1, and 3 tons methyl.

Equipment Shorts

Expansion of air conditioning facilities in the United Nations buildings at Lake Success, by the addition of 23 console type units, has been announced by Typhoon Air Conditioning Co., Brooklyn, N. Y. Installation, totalling 140 tons of refrigeration capacity, was made by contractor Harold J. Ryan, Inc. The units are being utilized in connection with a central system which was already in existence on the premises. Chilled water is pumped into the coils to adapt these units to existing facilities. Units have been installed so as to serve various zones.

Arthur D. Little, Inc., Cambridge, Mass., is now producing the "Collins Helium Cryostat" which is said to be a relatively simple device for liquefying helium and which can maintain any temperature down to −456 F. The unit is the invention of Dr. S. C. Collins, Massachusetts Institute of Technology. Its novel technical features include a heat exchanger which cools the compressed helium from room temperature to liquid helium temperature, and yet weighs only a few pounds, and a piston and cylinder expansion engine originally developed for use in oxygen generation. At the present time the manufacturer is able to supply units to laboratories for low temperature research.

A drive to hire 1540 men and build night shifts at Allis-Chalmers Mfg. Co., Milwaukee, to a record peacetime high is now under way. "Because of an increasing number of orders, our need for additional personnel is urgent," according to J. M. White, vice president in charge of manufacturing, who also stated that the order backlog in the company's general machinery division alone is now more than $166 million. The drive for new employees is part of the company expansion program for which more than $38.8 million has been appropriated in recent years.

if you use Refrigeration you have a Need for

CORK

For all low temperature operations, here are facts to remember:

- **Cork is MONEY-SAVING!** Millions of dead-air cells in every square inch of Cork insulation cause it to serve as a most efficient *natural* barrier to heat flow. By its use, refrigeration is conserved to the most practical limits.
- **Cork is LONG-LASTING!** Cork has a high degree of stability. It is a most durable material and continues to serve for many years at highest efficiency.
- **Cork is TIME-TESTED!** The use of Cork insulation has kept pace with the development of refrigeration and cold storage. Its wide acceptance in these "heavy-duty" industries is due to its proved record for more than 40 years.
- We preserve Cork's natural advantages in Mundet insulating products. Mundet engineers offer responsible assistance in building or expanding low temperature facilities. Let us help you secure low operating cost and maximum service. Write for our cork insulation manual. Mundet Cork Corporation, Insulation **Division, 7101 Tonnelle Avenue, North Bergen, New Jersey.**

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CORK INSULATION

CONSERVES LOW TEMPERATURE

Mundet district offices are located in these cities:

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DETROIT 21
14401 Prairie Street
HOUSTON 1
Commerce and Palmer Streets
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1212 Mary Street
KANSAS CITY 7, MO.
1428 St. Louis Avenue
LOS ANGELES
(Maywood)
6116 Walker Avenue
NEW ORLEANS 16
315-25 N. Front Street
PHILADELPHIA 39
850 N. 48th Street
ST. LOUIS 4
2415 South Third Street
SAN FRANCISCO 7
440 Brannan Street

In Canada:
Mundet Cork & Insulation, Ltd.
35 Booth Avenue, Toronto

Write us for name of our nearest representative if there is no Mundet office in your city.

Sentry-

FUEL AND HEAT CONTROLS

SENTRY DRAFT REGULATORS

100% Free Flowing draft — when required

All unnecessary working parts have been eliminated in this new economical and efficient draft control. Baffle plate and mounting ring are of durable light weight aluminum—bearings and pivots of non-corrosive brass. This permits free, automatic operating action and feather-light sensitivity to the slightest air currents at all times — as well as assurance of long life. Pre-setting balance is carefully factory adjusted. Sentry regulators are available in sizes from 4" through 10" in diameter for horizontal or vertical pipe installations.

AT-A-GLANCE TANK GAUGES

The outstanding gauge in the field, it was chosen for nearly 50% of the installations made in 1945-46. Clear visibility with accurate, easy reading from all directions is only one of its many features. In addition, simplified mechanism eliminates intricate working parts such as gears, cams, springs or magnets which often cause trouble and wear out. Fully approved and listed as standard by the Underwriters' Laboratories, Sentry at-a-glance gauges are durably built, guaranteed leak-proof and will withstand filling pressure of more than 50 lbs. per sq. inch. Installation is quick and easy—even when a tank is partially filled. Sentry gauges are factory designed and constructed to fit all tank sizes and shapes, including barrels and drums.

Write for fully illustrated brochure.

KRUEGER Sentry PRODUCTS
GREEN BAY • WISCONSIN

Equipment Shorts (Cont.)

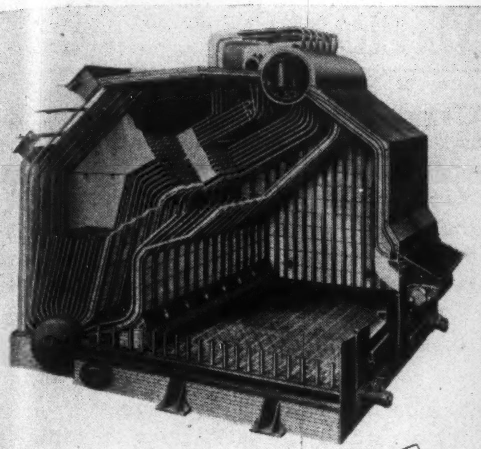
Acquisition of additional production facilities has been announced by Tenney Engineering Inc., Newark, N. J., manufacturers of refrigeration and air conditioning equipment. The additional space acquired will be used for construction and storage of bulky units in the company's line, permitting the use of more space in the original premises for the manufacture of refrigeration valves, mullion units, and similar products.

Introduction of "Hevimet," an alloy of tungsten, copper and nickel, has been announced by the metallurgy division of General Electric Co.'s chemical department. The alloy is said to possess a density 50 percent greater than lead and to be applicable to the design and construction of moving parts requiring maximum inertia and minimum size. Originally developed as a high density material for use on a gamma ray screen, the alloy is said to be especially suitable in the construction of balance weights, modern air screws, centrifugal clutches, and other rotating parts. The material is also said to be highly resistant to atmospheric salt water corrosion and to be easily plated with cadmium, chromium, and nickel.

Westinghouse Electric Corp., East Springfield, Mass. will introduce a line of seven hermetically sealed water coolers this year. Features adopted and built into the new line include an automatic pressure regulator for maintaining constant stream height, a new type orifice on the bubbler to prevent squirting and water damage, foot pedal operation for convenience and sanitation, and a removable front panel for easy access to mechanical parts. These coolers will be designed for commercial, institutional, and industrial applications.

The Permanente Metals Corp., Oakland, Calif, has announced that its bid for a German foil plant has been accepted by the Foreign Liquidation Commissioner and the sale has been approved by the State Department. The plant will probably be located in the state of Washington where the company now operates three other aluminum plants. Total cost of the relocated plant is expected to be approximately $1 million. The plant will be the only aluminum foil rolling mill west of the Mississippi. Among the many products this plant is capable of producing are foil used in the manufacture of electronic, radio, refrigeration, and air conditioning equipment. Following the announcement of this purchase, Kaiser aluminum officials disclosed that the company is considering the addition of aluminum rod, bar, and wire making facilities to its rolling mills in Spokane.

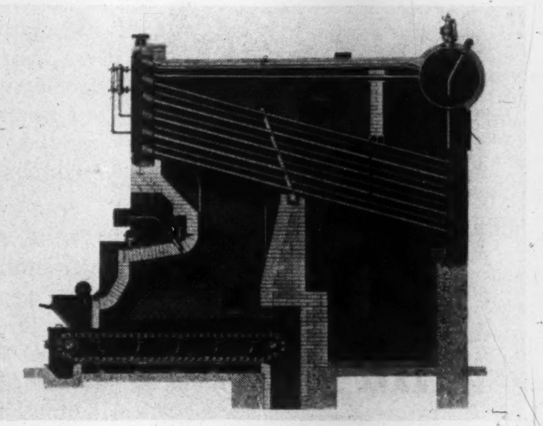
A 16 mm motion picture sound film depicting zinc coating by the hot dip galvanizing process is now available for showing. The film is said to be the first and only such visual medium used to acquaint audiences with the process. Running time is 25 min. Request inquiries should be addressed to Stuart J. Swensson, secretary and treasurer, American Hot Dip Galvanizers Association, Inc., 1611 First National Bank Bldg., Pittsburgh 22, Pa.



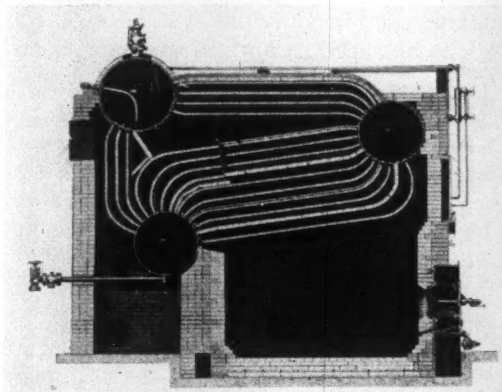
Big BENEFITS ARE "WRAPPED UP" IN THESE THREE SMALL BOILERS... B&W "CUBS"*

INTEGRAL FURNACE BOILER

Design 32, Type H Stirling, and Type FF Integral-Furnace Boilers were specifically designed for this purpose: supplying steam requirements from 10,000 to 50,000 lb. per hr. and more at pressures above 160 psi, with definite cost-saving benefits to their users in installation, operation and maintenance.



DESIGN 32 BOILER



ALL are fully coordinated, flexible units — from fuel burning equipment to breachings and stacks—built and installed under undivided responsibility.

ALL are time-tested, performance-proved units of simplified design and standardized manufacture.

ALL fully meet modern requirements as to fuel flexibility, compactness, ease of operation, fast-steaming and ability to take sudden load swings.

ALL sustain high operating efficiency over their wide range of output, and generate steam of satisfactory quality at all ratings.

ALL have provision for the addition of steam superheaters.

ALL embody design, construction and operating features that account for the heavy preference for larger B&W boilers for central stations and large industrial applications.

ALL are matched to their jobs for highest standards of performance, continuity of service and long-term economy.

TYPE H STIRLING BOILER

***Complete Unit BoilerS**

Each as much a package boiler as any unit its capacity can be.

G-382

FOR POWER PLANTS — B&W, Open-Pass, Radiant, Integral-Furnace, Cross-Drum, Stirling and Waste-Heat Stationary Boilers . . . Air Heaters . . . Economizers . . . Superheaters . . . Water-Cooled Furnaces . . . Oil, Gas & Multi-fuel Burners . . . Chain-Grate Stokers . . . Stacks and Breechings . . . Seamless & Welded Tubes . . . Refractories . . . Chemical Recovery Units . . . Alloy Castings.

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OTHER B&W PRODUCTS — Marine Boilers . . . Pressure Vessels . . . Process Equipment.

BABCOCK & WILCOX

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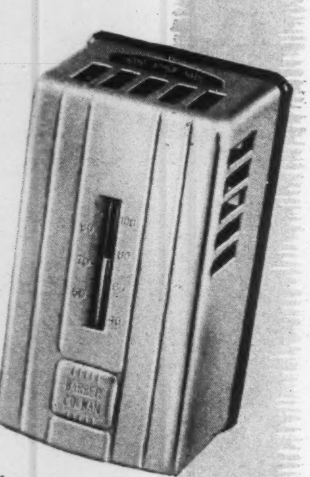
WORKS: ALLIANCE AND BARBERTON, O.; AUGUSTA, GA.

BARBER COLMAN

New Designs in Controls...

ROOM THERMOSTATS

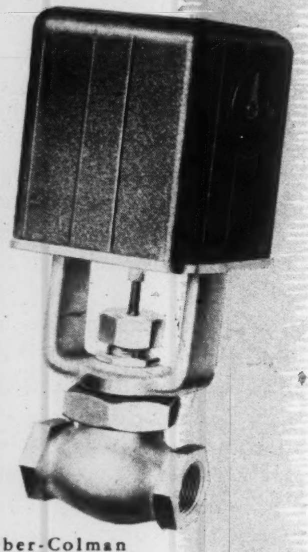
The new Room Thermostat is designed for pleasing proportions, smaller size, and unobtrusive appearance. Redesign of the operating elements, detents, adjusting mechanism, and contacts produces a more accurate, more sensitive, more durable control instrument. New cases also appear on the Microtherms, with corresponding improvements.



Shown here is the new Barber-Colman Room Thermostat. Case dimensions are 2" wide, 4" high, 1½" deep.

MOTOR-OPERATED VALVES

Complete new design of the operating mechanism and housing is featured in the most popular sizes of Motor-Operated Valves. The cover is now metal, with a durable black crinkle finish. An indicating pointer on the outside of the case shows at a glance whether the valve is open or closed. Various carefully-engineered changes in the motor, reduction gear train, switch contacts, and other components combine to produce better motor-operated valves.



New Barber-Colman Motor-Operated Valve. The new design results in a better-looking, smaller, more compact unit.

WRITE FOR NEW CATALOG...

All of the numerous new ideas and improvements incorporated in Barber-Colman Automatic Controls for Heating and Air Conditioning are covered in a new Catalog. Write today for your copy, or ask your Barber-Colman representative.

BARBER-COLMAN COMPANY
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Automatic Controls for Heating and Air Conditioning

REPRESENTATIVES IN ALL PRINCIPAL CITIES

EXECUTIVE CHANGES

R. H. Morse, Jr., vice president and general sales manager, Fairbanks, Morse & Co., Chicago, has announced the appointment of L. A. Weom as manager of the company's pump division to take the place of Arnold Brown who has resigned. Except for three and one half years, spent as an officer in the U.S. Navy during the recent world war, Mr. Weom has been with the company since 1929 when he started as an assistant in the pump and electric department of the St. Paul, Minn., branch.

D. D. Wile has been appointed chief engineer of Refrigeration Engineering, Inc., Los Angeles, according to an announcement by Hy Jarvis, vice president and general manager. Mr. Wile's experience, which covers nearly a quarter of a century, is marked by many technical developments for which he has received numerous patent awards. He is widely known throughout the industry and has presented a number of papers before various engineering societies.

R. H. Warmee, sales promotion manager for Minneapolis-Honeywell Regulator Co. since 1940, has recently been appointed sales manager of the company's Moduflow division. In addition to being a wellknown writer and lecturer on sales subjects, he is regional director of the National Federation of Sales Executives and president of the Minneapolis Association of Sales Managers. His former sales promotion activities will be managed by J. A. Young who has been serving as assistant in the department.

G. W. Plank has been named district sales manager of the newly established western sales district of the L. J. Mueller Furnace Co., Milwaukee. San Francisco is the headquarters for the new district office which will cover the states of California, Arizona, Oregon, Utah, Nevada, and the western parts of Washington and Wyoming.

Dravo Corp., Pittsburgh, has appointed W. C. Collins as director of advertising. A native of East Orange, N. J., he was graduated from Williams College in 1929 and has attended the Universities of Grenoble in France and Heidelberg in Germany. He was adviser to the U. S. Delegation at the Fifth International Conference on Public Instruction at Geneva, Switzerland, and he is now serving a second term as president of Eastern Industrial Advertisers, Philadelphia. He is also a director and chairman of the finance committee of the National Industrial Advertisers Association.

The Fluor Corp., Ltd., Los Angeles, has established a customer service department to handle the servicing of its various products of manufactured equipment. E. L. Bishop, who has been with the company for 12 years in the manufacturing department, will be in charge of this service for the mid-continent area.

C. C. Walker has been elected a commercial vice president of General Electric Co., Schenectady, N. Y. With his headquarters in Boston, he will assume responsibility for customer relations in the New England territory. He succeeds **T. S. Knight**, commercial vice president, who retired after 44 years of service with the company.

The Sturtevant Division of Westinghouse Electric Corp., Hyde Park, Mass., has announced the appointment of **R. H. Martin** as manager of its industrial department. He succeeds Alexander Martin who has gone to Pittsburgh to head the division's central district. The two men are not related. The new manager will direct the application of air handling equipment for all types of industrial plants and processes.

Gustav A. Rehm has been named chief engineer for Springfield Boiler Co., Springfield, Ill., and will head all of the engineering activities of the company in connection with steam generators and related equipment. He is wellknown to the engineering profession as a result of the prominent part he has played in boiler design and development. He succeeds **W. Ross Irwin** who has recently engaged in private engineering practice with headquarters in Springfield, Ill. Mr. Irwin is specializing in the supervision of steam plant operation for clients located in the middle west and will continue to be available to the company as a consultant.

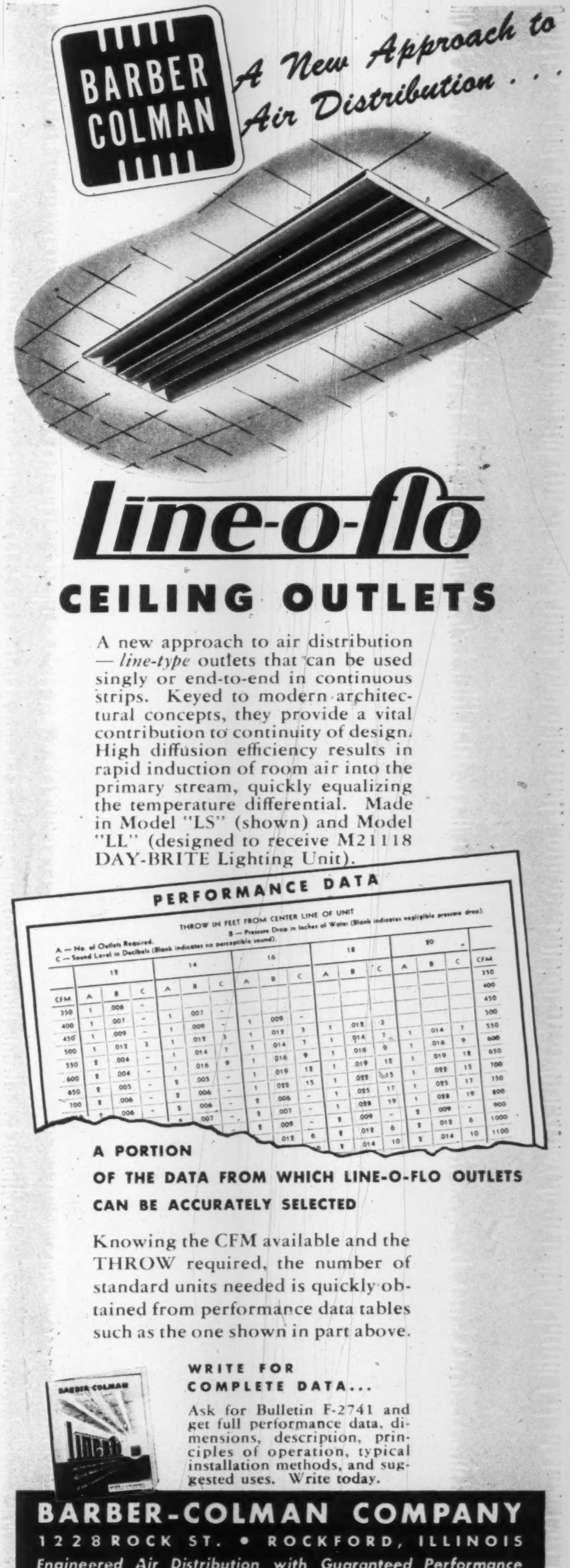
Further expansion of the Kaiser aluminum sales program was announced by Permanente Metals Corp., Oakland, Calif., with the appointment of 23 distributors throughout the United States. **R. G. Welch**, who has had wide experience with the Kaiser organization, will manage the new aluminum distributor sales.

Announcement has been made by Link-Belt Co., Chicago, that **L. C. Heinlein** has been appointed to the newly created position of assistant superintendent at the company's ball and roller bearing division plant in Indianapolis. He has worked in various departments of the company since 1926 when he was graduated from Purdue University, school of mechanical engineering.

The recent appointment of **Columbus Basile** as superintendent of the company's Caldwell plant in Chicago has also been announced. Coal stokers, conveyors, ice slingers, and other items of material handling and power transmission equipment are manufactured at this plant.

Announcement has been made of the appointment of **J. D. Lightbody, Jr.**, as assistant to President L. C. Harvey of Bryant Heater Co., Cleveland. He graduated from Harvard in 1940 and during the war served as a maintenance instruction officer, ordnance, Aberdeen Proving Grounds, Md.

F. A. Nichols has been named president and general manager of Ozo-Ray, Inc., Chicago. He is an electrical engineer with long experience in engineering, transportation, business, and manufacturing. Development and production of machines for producing pure ozone will be expanded under his direction.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A New Approach to Air Distribution . . .

LINE-O-FLO

CEILING OUTLETS

A new approach to air distribution — *line-type* outlets that can be used singly or end-to-end in continuous strips. Keyed to modern architectural concepts, they provide a vital contribution to continuity of design. High diffusion efficiency results in rapid induction of room air into the primary stream, quickly equalizing the temperature differential. Made in Model "LS" (shown) and Model "LL" (designed to receive M21118 DAY-BRITE Lighting Unit).

PERFORMANCE DATA

THROW IN FEET FROM CENTER LINE OF UNIT

A — No. of Outlets Required.
B — Pressure Drop in Inches of Water (Blank indicates negligible pressure drop).
C — Sound Level in Decibels (Blank indicates no perceptible sound).

	12			14			16			18			20			
CFM	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	CFM
350	1	.006	-													350
400	1	.007	-	1	.007	-										400
450	1	.009	-	1	.009	-	1	.009	-							450
500	1	.012	3	1	.012	3	1	.012	3	1	.012	3				500
550	2	.004	-	1	.014	7	1	.014	7	1	.014	7	1	.014	7	550
600	2	.004	-	1	.016	9	1	.016	9	1	.016	9	1	.016	9	600
650	2	.005	-	2	.005	-	1	.019	12	1	.019	12	1	.019	12	650
700	2	.006	-	2	.006	-	1	.022	15	1	.022	15	1	.022	15	700
	2	.006	-	2	.006	-	2	.006	-	1	.025	17	1	.025	17	750
					.007	-	2	.007	-	1	.028	19	1	.028	19	800
							2	.009	-	2	.009	-	2	.009	-	900
								.012	6	2	.012	6	2	.012	6	1000
										2	.014	10	2	.014	10	1100

A PORTION

OF THE DATA FROM WHICH LINE-O-FLO OUTLETS CAN BE ACCURATELY SELECTED

Knowing the CFM available and the THROW required, the number of standard units needed is quickly obtained from performance data tables such as the one shown in part above.

WRITE FOR COMPLETE DATA...

Ask for Bulletin F-2741 and get full performance data, dimensions, description, principles of operation, typical installation methods, and suggested uses. Write today.

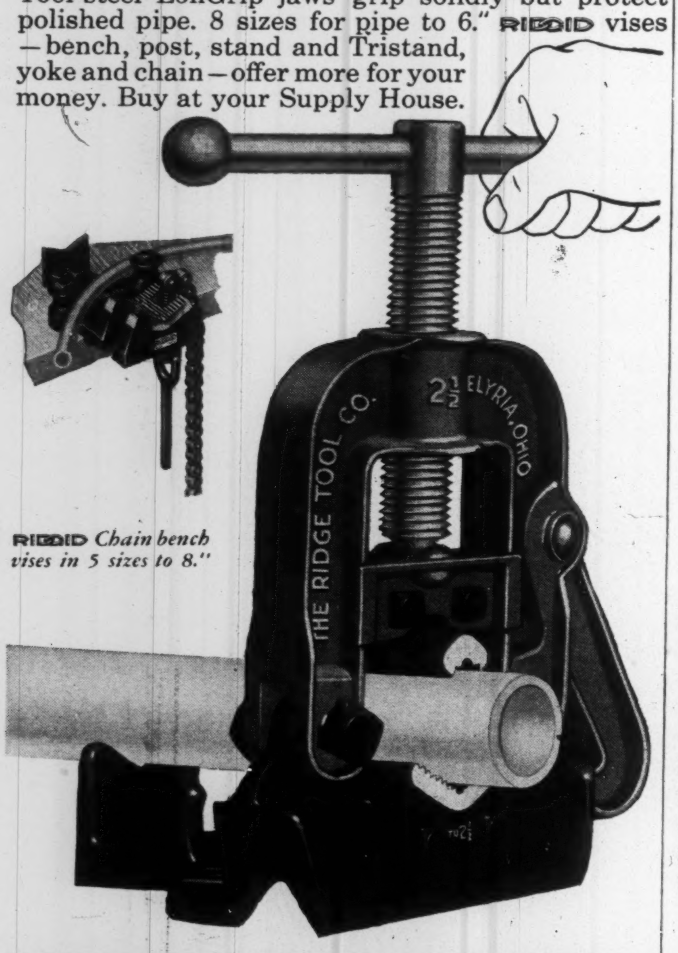
BARBER-COLMAN COMPANY
1228 ROCK ST. • ROCKFORD, ILLINOIS
Engineered Air Distribution with Guaranteed Performance

REPRESENTATIVES IN ALL PRINCIPAL CITIES

THE
Work-Saver
BENCH PIPE VISE

RIDGID Vises are all equipped with handy pipe benders and rests . . .

● Look for red yoke RIDGIDs and you find vises that make your pipe work easier, more efficient. Integral pipe rests support pipe firmly for threading and cutting. Handy built-in benders won't flatten pipe. Tool-steel LonGrip jaws grip solidly but protect polished pipe. 8 sizes for pipe to 6." RIDGID vises—bench, post, stand and Tristand, yoke and chain—offer more for your money. Buy at your Supply House.



RIDGID *Chain bench vises in 5 sizes to 8."*

RIDGID
WORK-SAVER PIPE TOOLS
THE RIDGE TOOL COMPANY • ELYRIA, OHIO

Executive Changes (Cont.)

M. L. Lavorgna has been appointed sales manager of the heating division, Richmond Radiator Co., New York City, according to a recent announcement by J. Hall, vice president and general manager. During the last 18 years Mr. Lavorgna has had wide experience with coal, gas, and oil fired heating equipment. A graduate of the University of Maine, where he studied electrical engineering, he is a member of the American Society of Heating and Ventilating Engineers and is a former member of the Sales Managers Club of Milwaukee. His headquarters will be at the company's general sales offices in New York City.

Kellen Wiles has been appointed executive assistant to G. C. Derry, general manager, Sturtevant Div., Westinghouse Electric Corp., Hyde Park, Mass. A 1931 graduate of Dartmouth, Mr. Wiles started with Sturtevant in 1934 in the cost and accounting departments. He then became associated with a subsidiary, Framingham Foundries, Inc., as general manager and later vice president. When this operation was terminated in 1945, he joined the purchasing department, and most recently has been a factory accountant.

At the recent meeting of the National Electrical Manufacturers Association in Atlantic City, A. H. Timmerman, vice president, Wagner Electric Corp., received a certificate for "fifty years of continuous service in the electrical industry." He helped form the American Association of Electric Motor Manufacturers in 1908, is a former member of the board of governors of NEMA, and is a Fellow in the American Institute of Electrical Engineers.

R. M. Gates, president, Air Preheater Corp., New York City, has announced that W. E. Hammond has joined the company's staff. Mr. Hammond will be located at the Wellsville, N. Y., plant. Since 1942 he has been chief of the engineering, scientific, and electrical branch, design division, of the U.S. Maritime Commission.

The appointment of works managers of the Chicago and Kalamazoo, Mich., plants of Ingersoll Steel Div., Borg-Warner Corp., has recently been announced. The Chicago post goes to J. A. White, formerly general superintendent of the Columbia Steel Co., Pittsburgh, Calif. The Kalamazoo post will be filled by M. F. McCammon who has been assistant works manager there for the last year. R. S. Ingersoll, who formerly served as works manager for both plants, will devote his full time to duties as vice president of the steel division in charge of manufacturing at the Chicago, Kalamazoo, and Evansville, Ind., plants.

The newly appointed sales manager of The Schaible Co., Cincinnati, is C. B. Mueller, Jr., who will carry out the sales program for all of the company's plants, including the recently acquired factory facilities of the General Tire & Rubber Co., Pasadena, Calif. Prior to this promotion, Mr. Mueller was manager of the manufacturing sales division.

NEW BOOKS & REPORTS

Industrial Hygiene Handbook Provides Data for Correct Design

"Personnel in the Pink," that's what the Wall Street Journal called it in a feature article on clean air for the industrial worker. "Pure air pays" say the manufacturers of air handling equipment. Dr. Allen D. Brandt follows the accepted pattern of engineering and scientific writers by giving his new book, which covers a dramatic problem and its solution, the colorless title, Industrial Health Engineering. When you get behind the title, however, you find that the subject is treated with vigor and enthusiasm, and a very readable book is the result.

In the preface the author says " . . . most of the control equipment installed in the past, and even today, is thrown in by tinsmiths . . . or designed by plant engineers or consulting engineering firms who do not have the benefit of much information . . . which is available to the industrial hygiene engineer." The book is thus directed to the attention of plant engineers and designing engineers who have the responsibility of designing, purchasing, and installing controlled air systems required for the *health* of the industrial worker. It makes little difference whether the controls are required by state industrial commissions, insurance companies, or labor unions. Many progressive industrialists have found it actually pays to provide good air. Dr. Brandt says "a much too large percentage of the control installations . . . which have been made and are being made today are wholly unsatisfactory." He suggests that the designer can find in this book the information and data needed for the correct design of control equipment so that it has a "fair" chance of doing a satisfactory job. Dr. Brandt is to be commended for his reserve and yet it must be agreed that most industrial ventilation systems do involve compromises of one kind or another, so that even when you *know* all the right methods as disclosed in the book you may still fall short of perfection in the execution.

The book starts out with a chapter on contaminants and includes (for the first time printed in one place) a list of maximum allowable concentrations of some 120 materials which create air hazards of dusts, fumes, mists, gases, and vapors. Then it presents a table of occupational health hazards—148 in number—which arise from these contaminants. The next table is a very comprehensive list of hazardous occupations with index numbers referring back to the table of health hazards. Thus the industrial plant designer who must provide for certain occupations is *forewarned* as to the probable hazards to be expected. Many occupations are shown to have a number of separate and distinct hazards; for example, 25 in the case of pyroxylin plastic workers, 41 for pharmaceutical workers.

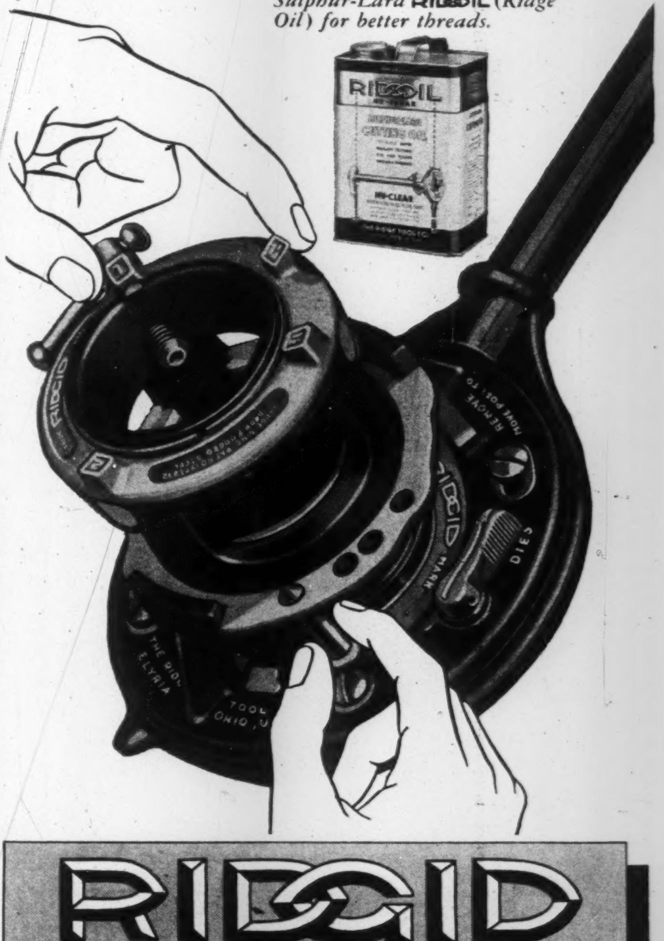
The author gives a clear explanation of the evaluation of the health hazards in an existing operation and a discussion of the principal methods of control, together with specific design methods, data, and equipment. The emphasis is on exhaust air systems, but the author includes the warning that the exhaust air must be replaced and make-up air must be heated in the winter.

Accurate
PIPE THREADS
Extra Fast

RIDGID No. 65R offers near machine-speed in threading 1" to 2" pipe

● It's unusually fast and easy for two reasons. You save on get-ready—10 seconds sets it to pipe size (1," 1¼," 1½," 2"), both chasers and workholder. And it threads any kind of pipe fast with surprisingly little effort—precision-made high-speed tool-steel dies that stay in the efficiency-balanced die stock. Factory tested—see test sample in each tool. It pays you to buy No. 65R—at your Supply House.

Sulphur-Lard RIDGOIL *(Ridge Oil) for better threads.*



RIDGID
WORK-SAVER PIPE TOOLS
THE RIDGE TOOL COMPANY • ELYRIA, OHIO

He indicates other problems in balancing out supply and exhaust air, all too commonly ignored in the present day technic. There is a good description of air measurement instruments and methods, as well as a brief resumé of respirators and protective clothing. Also included is a discussion of the problems of radiant heat, all too commonly neglected and misunderstood.

Chapters on illumination, noise, and plant sanitation are included for general information of the hygienist, but have little to do with the principal thesis of this book, which deals with air and air problems.

The chapter on heating, ventilating, and air conditioning leaves much to be desired. The discussion of the possibility of cooling by evaporation is handled as a humidifying operation, instead of as evaporative cooling, with which the air conditioning engineer is quite familiar.

The author neglects completely air conditioned plants (windowless buildings) many of which include hazardous occupations. During the war these industrial plants showed what could be done successfully when air was handled entirely under man's control. That may well be the subject for his next book. Such a book is certainly needed. This book does its own job well and shouldn't be expected to do everything.

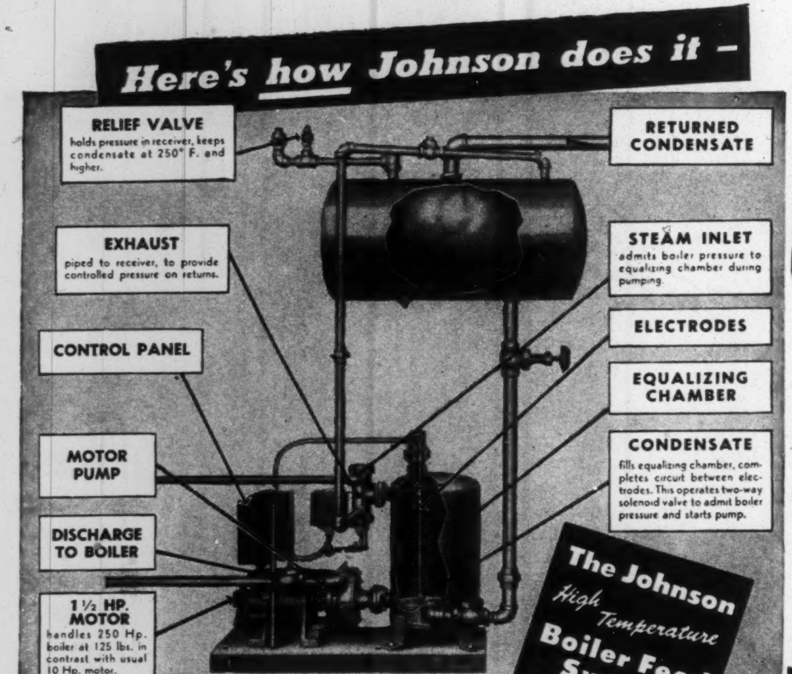
There is a bibliography of 221 references on various subjects which will be helpful to the designer or student. The appendix includes new tables on conversion factors for gases, composition of organic solvents, and other data relevant to the subject. If you have the book there is no excuse for not *knowing* the right thing to do. Whether you do it is something else.

Dr. Brandt will be remembered by many as the representative of the U. S. Public Health Service assigned to the American Society of Heating and Ventilating Engineers Research Laboratory two years ago to conduct research on atmospheric contamination in industrial ventilation. He served in the industrial hygiene division of the U. S. Public Health Service during the war. He is now engaged in the medical division of Bethlehem Steel Co. as industrial hygiene engineer. A previous book, entitled Manual of Industrial Hygiene, is in itself an outstanding contribution to the art. His education, training, and sincerity well qualify him to write this new text which the publisher terms "The first complete handbook on industrial atmospheric contaminants and their control."

Priced at $6.00, this clothbound book contains 395 pp. (5½ x 9 in.), and is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York City.—Reviewed by Lester T. Avery, president, Avery Engineering Co.

Cost Estimating Data Given in Air Conditioning, Refrigeration Text

Air Conditioning, by Herbert Herkimer, M.E., director Institute of Mechanical Trades and past national president, Refrigeration Service Engineers Society, and Harold H. Herkimer, M.E., is a new book which has evolved from the assembly of notes over a period of some 30 years. The authors have also drawn upon the vast store of data published by the American Society of Heating and Ventilating Engineers, and the American Society of Refrigerating Engineers, and to a minor ex-


Here's how Johnson does it –
RELIEF VALVE
holds pressure in receiver, keeps condensate at 250° F. and higher.
RETURNED CONDENSATE
EXHAUST
piped to receiver, to provide controlled pressure on returns.
STEAM INLET
admits boiler pressure to equalizing chamber during pumping.
ELECTRODES
CONTROL PANEL
EQUALIZING CHAMBER
MOTOR PUMP
CONDENSATE
fills equalizing chamber, completes circuit between electrodes. This operates two-way solenoid valve to admit boiler pressure and starts pump.
DISCHARGE TO BOILER
1½ HP. MOTOR
handles 250 Hp. boiler at 125 lbs. in contrast with usual 10 Hp. motor.
The Johnson High Temperature Boiler Feed System

..pays its way in one year

Admittedly the claims made for this Johnson System sound like a pretty big order. But there are hundreds of installations and plenty of sound engineering reasons, as pointed out opposite, to back them up. The Johnson System accomplishes two big things—gets condensate back to boiler at higher temperatures, and eliminates the power-consuming task of pumping against boiler pressure. In dollars and cents this amounts to power savings of as much as 60%, fuel savings up to 15%.

Available in sizes for boilers from 30 to 500 Hp., up to 200 lbs. pressure. Multiple units for larger boilers.

Write for literature and the name of your nearby Johnson representative.

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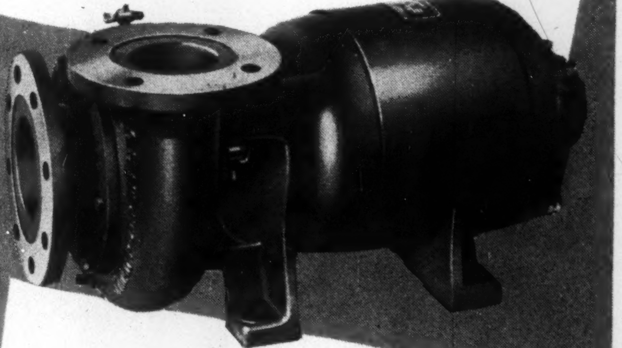
NOTE: *this message will interest plant and consulting engineers who know that an air-conditionig system is no better than the pumps employed!*

where EFFICIENCY! . . . ECONOMY! . . . and DEPENDABILITY! . . . count!

A WEINMAN PUMP IS THE HEART OF THE AIR-CONDITIONING SYSTEM!

What greater proof of quality can any pump offer than its on-the-job performance record? . . . and the WEINMAN pump record for day in and day out *Dependability!* . . . *Efficiency!* . . . and *Economy!* . . . as the heart of countless air-conditioning systems, is a record to convince you that *Weinman Pumps Are "Right" For The Job* . . . made right by centrifugal specialists who know air-conditioning pump requirements.



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Especially adapted for circulation of chilled water or brine. Sizes to provide capacities of 10 G.P.M. to 1000 G.P.M., heads to 500 ft., and motor ratings ranging from ½ hp. to 30 hp.

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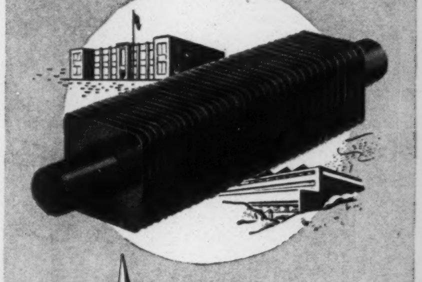

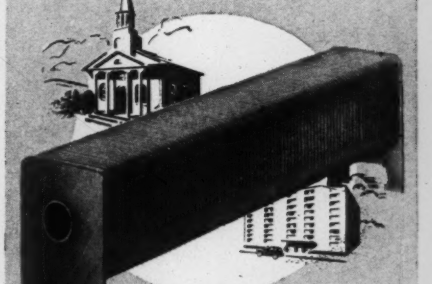

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tent, on data from manufacturers' technical literature.

The first third of the text reviews the laws of physics and chemistry associated with the science of heating, air conditioning, and refrigeration. In the remaining two thirds the authors discuss such subjects as health and comfort, fans, ducts and air distribution, heating load, cooling load, dehumidification and humidification, spray systems and cooling towers, drying, cooling methods and refrigeration, unit air conditioners, central air conditioning systems, industrial air conditioning, automatic controls, and cost estimating. Also included is a glossary of terms used in heating, ventilating, refrigerating, and air conditioning work, together with abbreviations, conversion tables, and graphical symbols.

When considering the increasing amount of published material on the subject of air conditioning, it is too easy for a reviewer to become overly critical. It is recognized that the author usually must endeavor to offer a book suitable for teaching while at the same time useful to practicing engineers. This is quite an undertaking because it means combining simple explanations and examples with tabular or other handbook data.

This text is subject to criticism by practicing engineers on two counts: there is not enough original material, and the source of data is not always identified. A teacher would probably insist on problems for each chapter and more examples illustrating the use of tabulated data. He would also note some errors and duplication of material in the text.

The chapter on cost estimating deserves commendation. This is a difficult subject to treat and the danger of over-simplification due to generalization has not been overlooked. Although the material is far from complete, a good start has been made in giving partial cost data pertaining to one locality. Operating costs are also mentioned but only partially covered.

Twenty pages have been devoted to panel heating. This subject has become increasingly important and the authors have reduced the discussion of the various methods of providing such heating systems to the essential minimum.

This clothbound text is published by the Chemical Publishing Co., Inc., 26 Court St., Brooklyn 2, N. Y., contains 692 + ix pp. (5½ x 8½ in.), and is priced at $12.00.—Reviewed by Realto E. Cherne, consulting engineer, Rochester, N. Y.

Says Activated Carbon Reduces Air Conditioning Costs in Hotels

Impressive savings in both the initial and operating costs of air conditioning systems, under both winter and summer conditions, plus a new high in odor control may be realized in hotels through the use of activated carbon air filters, according to Research Report No. 15, Air Recovery and Odor Control in Air Conditioning Systems, which was prepared for the American Hotel Association by the York Research Corp. of Connecticut.

The report, which has been reprinted to familiarize hotel managers with a method for "recovering" recirculated air so that outside air quantities may be materially reduced, leads off with a brief statement of air conditioning principles with respect to oxygen requirements and air contaminating impurities. It is stated that dust can be removed by filters, smoke particles by

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The Third Edition of

AIR CONDITIONING FOR COMFORT

by SAMUEL R. LEWIS

288 Pages—6½" x 9¼"—Cloth Bound

Easy to understand . . . accurate . . . comprehensive . . . these are the features of this third edition of Samuel R. Lewis' well-known AIR CONDITIONING FOR COMFORT.

Fundamentals are fully and clearly covered. Correct procedure in designing complete systems for both residences and large buildings is explained step by step. In addition, considerable original data on such subjects as standards, noise control, measurements, and fire protection codes has been included.

Send $2.00 for a copy today to the address below. We know you will consider this one of the finest air conditioning books you have yet seen, but if you should be dissatisfied with it for any reason whatever, your money will be promptly returned to you.

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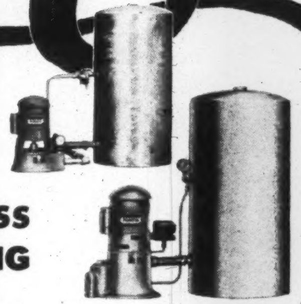

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Capacities: 275 to
860 Gals. per hour.
"The Only Pump with
Magic Wings to Water Lift."

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Capacities: 120 to
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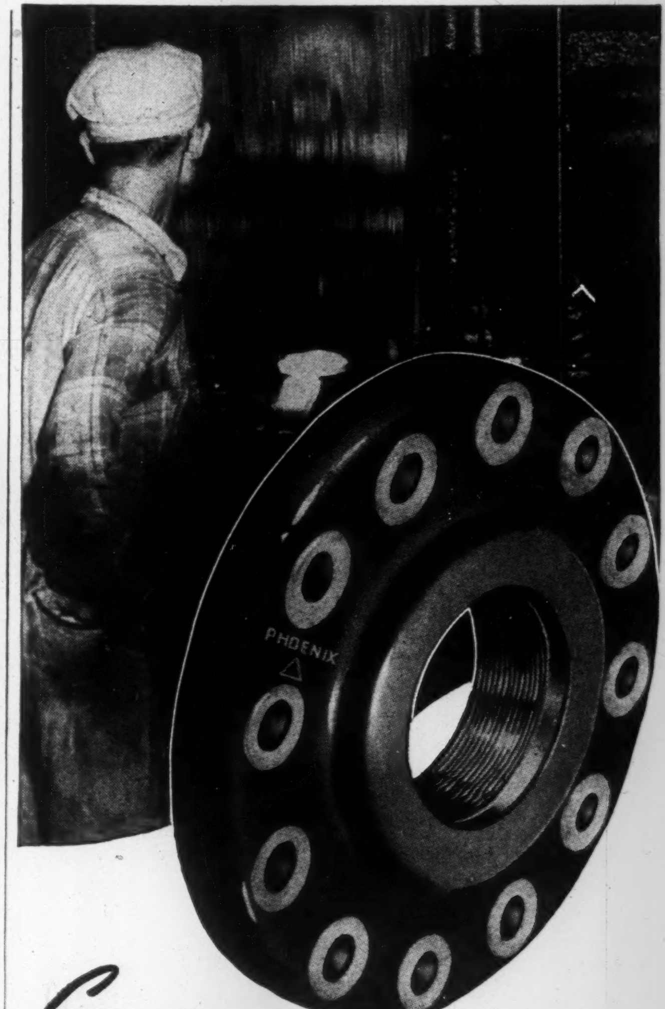

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electrostatic precipitators, and bacteria by ultraviolet rays. Gases and vapors must be diluted if the air is to be used indefinitely, and the methods mentioned include condensation by reduction of the air temperature, washing or scrubbing, and adsorption. This last method, which is the basic principle of activated carbon filters, is said to be easy to apply and reasonable in cost.

The major portion of the report deals with the properties of activated carbon and how it is used commercially. Data are given on available equipment, methods of installation, reactivation, and the comparative costs of conditioning and "recovering" 4000 cfm of air.

AHA members desiring copies of the report should address requests to the service department, American Hotel Association, 221 W. 57th St., New York 19, N. Y.

Utilities Study the Heat Pump As a Load Building Development

The indoor climate committee of the Edison Electric Institute is giving consideration to the heat pump as a load building development. This interest stems basically from the fact that the average annual electrical consumption in the homes of the nation now exceeds 1300 kwhr per year, whereas the installation of a heat pump for heating would roughly require an additional 8400 kwhr per season (based on 60,000 Btu heat loss for the house and 4585 degree days per season).

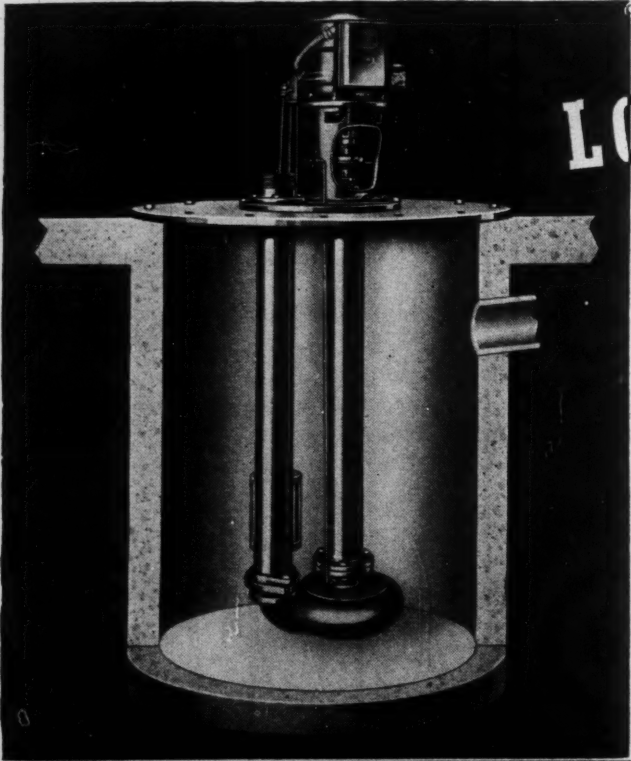
Opening with a brief history of the unit, the report briefly covers operating principles and discusses the use of air, water, and the earth as heat sources. The problems which must be overcome before "wide usage" of the heat pump can be considered practical are mentioned and the development and research work, which has been and is being done, is reviewed. A survey of installations, given in tabular form, shows a total of 46 residential and 114 commercial installations. It is to be noted that the majority of installations listed use air as the heat source.

In order that the electric industry may have factual information at hand for evaluating the progress being made, the committee will survey and publish pertinent information as it becomes available. This first report, identified as Publication No. P-6, The Heat Pump—What It is—Its History—The Electric Company's Interest in Its Development, may be obtained from the Edison Electric Institute, 420 Lexington Ave., New York 17, N. Y. for 25 cents per copy.

Other Books and Reports Received

Meteorology for All, by Irving Kohn. Published by Barnes & Noble, Inc., Fifth Ave. at 18th St., New York 3, N. Y. Price, $2.00 per copy. An illustrated primer for prospective meteorological students, giving an overall picture of the science of the weather.

1947 ASTM Standards on Copper and Copper Alloys, published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price, $4.00 per copy. Includes cast and wrought materials, electrical conductors, and nonferrous metals used in copper alloys. The 462 page book includes 15 specifications for a variety of wire, rods, etc., 12 standards covering nonferrous metals, and 110 pages covering methods of tests.



LOW and DRY . . .
WITH ECONOMY'S
NON-CLOG SUBMERGED SUMP PUMP

Always alerted, ready when needed, Economy's automatic-starting, submerged, non-clog sump pump is first choice for large-area basement drainage. Single or duplex installations, with capacities from 50 to 7000 G.P.M. Screenless—no strainers required. Unusually free from servicing.

Other important uses: drainage of industrial refuse pits; scale and elevator pits; boiler pits; small municipal sewage stations.

Write DEPT. C-1 *for*
CATALOG No. E-345

A complete story, with spex, installation drawings, etc.

Economy Pumps Inc,
HAMILTON, OHIO

dependable performance with
Janette
Blower Wheels
5 in. to 12 in.

NO OTHER WHEEL LIKE IT

A Special Patented Construction is used which results in an exceptionally rigid, rugged wheel that will deliver its rated capacity indefinitely.

JANETTE builds **63 different sizes** of single inlet **and 22 sizes** of double inlet wheels, with air capacities of from 67 to 4620 c.f.m.

For Over 20 Years Janette Wheels have been sold as a high quality product, to manufacturers whose names are the "Who is Who" of the stoker, air conditioning, oil burner, ventilating, generator, air cooled gas engine, supercharger and dust collector industries.

When you want quiet, efficient, reliable blower wheels, SPECIFY JANETTE.

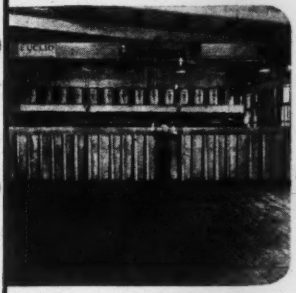
ASK FOR BULLETIN 24-1

Janette

Janette Manufacturing Company
556 W. Monroe St. Chicago 6, Ill.

Pratt & Whitney Keep This Room at 68 deg. F, the Year 'Round.

Hold Any Temperature You Want with



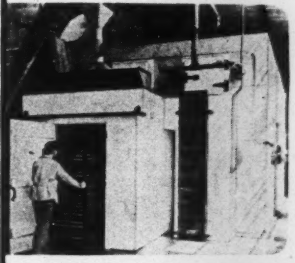
One-man One-shift Semi-Automatic Plant Makes 42 Tons of Ice Daily.

TRADE **FRICK** MARK

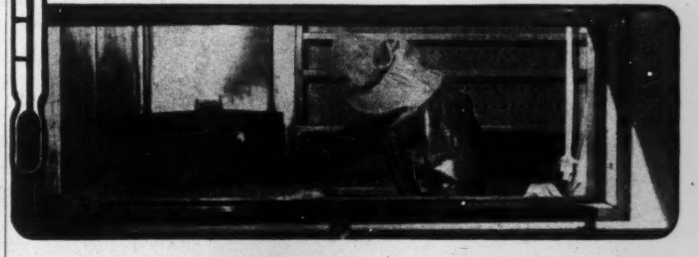
Refrigeration

"Cold" down to 130 degrees below zero F. is now common in research and test work. Penicillin is dried at minus 75. Foods are quick-frozen at minus 30 to minus 60: are stored at zero to minus 20. Ice is frozen commercially in brine at 16. Fresh foods are held at 34 to 36. Drinking water is cooled to 45. Air conditioning, at 70 to 85, tops the scale of refrigerating loads. ● Whatever the temperature wanted, you can hold it most dependably with Frick Refrigeration. Sixty-five years' experience says so!

Frozen Foods Stored at -10° F. by Birds Eye-Snider.



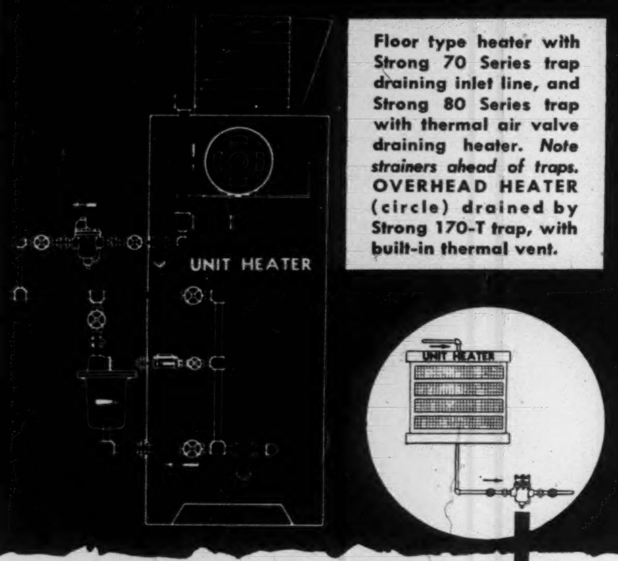
Frick-Freezer Tunnel operated at -35° F. at Lancaster, Pennsylvania.



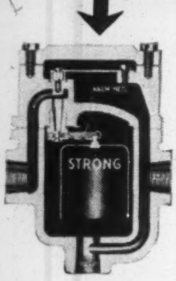
Test at -76° F. in a Refrigerated Laboratory of Bendix Radio.

DEPENDABLE REFRIGERATION SINCE 1882
FRICK Co.
WAYNESBORO, PENNA. U.S.A.

MORE HEAT·FASTER WITH LESS FUEL!



Floor type heater with Strong 70 Series trap draining inlet line, and Strong 80 Series trap with thermal air valve draining heater. *Note strainers ahead of traps.* OVERHEAD HEATER (circle) drained by Strong 170-T trap, with built-in thermal vent.



Strong 170-T trap with integral thermal air vent and new HI-CAP*Orifice. Available in sizes from ½" to 1¼".

*Reg. Trade Mark

Accumulated condensate and trapped air can make unit heaters slow in starting. Uncertain drainage will seriously reduce heat output.

LEAKY TRAPS WASTE FUEL

While *all* Strong Inverted Bucket Traps will handle large amounts of air, the hookups shown here provide thermal air vents for practically instantaneous heating. Use of Strong traps, guaranteed for a year against leakage, insures positive drainage without waste of steam.

Completeness of the Strong line enables us to recommend exactly the right type and size of trap you need—open or inverted bucket, closed float, float-and-thermostatic (blast), etc.—semisteel, cast, forged and welded construction. Send your drainage problems to us for the *right* solution.

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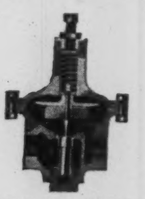
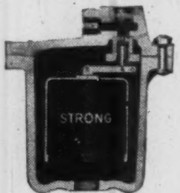
OTHER STRONG STEAM SPECIALTIES



Reducing Valve



No. 80 Series Trap

Strainer

STRONG

MEETINGS & CONVENTIONS

Minnesota Engineering Societies To Hold Convention and Exposition

The 15 members of the Minnesota Federation of Engineering Societies will hold their 26th annual convention and third annual exposition, February 11 to 14 in the Hotel Lowry, St. Paul, Minn. Luncheons, business sessions, symposia, technical discussions, and various talks are planned. Katherine A. Feucht, 1000 Guardian Bldg., St. Paul, Minn., is federation secretary.

AICE Members to Discuss Low Temperature Insulation

Low temperature insulation and high temperature refractories are the subjects of two symposia planned for the first 1948 regional meeting of the American Institute of Chemical Engineers, to be held at the Roosevelt hotel, New Orleans, February 15 to 19. Several general chemical engineering papers and a large number of visits to industrial plants are also planned. Institute headquarters is at 50 E. 41st St., New York City.

To Sponsor Engineering Show

The junior members of the Engineers Club of Philadelphia and the Franklin Institute of the State of Pennsylvania will jointly sponsor a second Engineering Progress Show, to be held May 11 to 16 in Franklin Hall, Franklin Institute of Pennsylvania, Philadelphia. In addition to many exhibits depicting progress in engineering, two nationally prominent engineers will deliver lectures on two evenings during the week.

NDHA Members to Meet in St. Louis

The 39th annual meeting of the National District Heating Association will be held at the Hotel Statler, St. Louis, Mo., May 18 to 21, according to an announcement by J. F. Collins, Jr., secretary-treasurer, 827 N. Euclid Ave., Pittsburgh 6, Pa.

Many Products to Be On Display at Building Show

Over 2000 national and local industries are being invited to exhibit at the Third Annual Home and Building Exposition, to be held June 10 to 20 at the Pan-Pacific Auditorium, Los Angeles, according to M. J. Brock, president of the event which is owned by the Los Angeles Chamber of Commerce and 14 major construction industry associations of southern California. The show is planned to provide "a mammoth public showcase for the thousands of products and services essential to residential, industrial, commercial, and public works construction."

Pan-American Engineering Congress To Be Held in South America

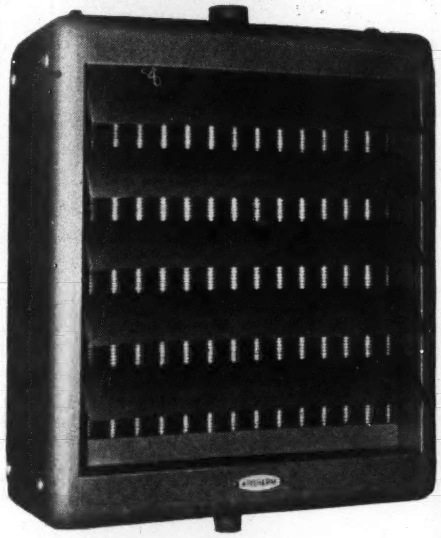
United States engineers will join with engineers of South America in a Pan-American engineering congress, to be held in South America late in 1948 or in 1949, according to an announcement by the Engineers Joint

You Can Safely Recommend

AIRTHERM

STEAM UNIT HEATERS

FOR OUTSTANDING PERFORMANCE



1. High over-all efficiency.
2. Attractive in design and rugged in construction.
3. Copper heating elements in floating suspension.
4. Resiliently mounted motors for smooth and quiet operation.
5. Capacities from 26,000 to 274,000 BTU per hour.

There's an Airtherm Steam Unit Heater for every heating application. Write for Bulletin 1206 giving detailed information and range of available sizes.

IT'S WISE TO BUY FROM YOUR DISTRIBUTOR...
He's located near you for quick deliveries and better service.

AIRTHERM MANUFACTURING CO.
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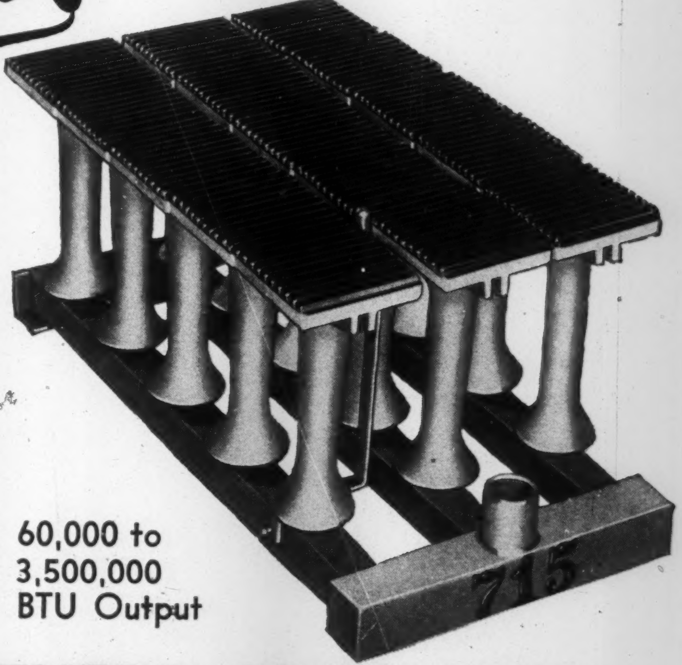
DIRECT FIRED HEATERS · PROPELLER FAN STEAM UNIT HEATERS · BLOWER FAN STEAM UNIT HEATERS · CONVECTOR RADIATION

Reinhard

700 Series
INDUSTRIAL
CONVERSION GAS BURNERS



"TAILORMADE" to Fit Your Requirements

The Reinhard 700 Series embodies all the latest developments in conversion burners for cast iron sectional and steel fire box boilers. The cast burner heads employ the Up-Shot principle and are made to withstand tremendous heat. Quiet in operation, they make maximum use of fuel to give real economy of operation.

60,000 to
3,500,000
BTU Output

REINHARD BROTHERS COMPANY
11 South Ninth Street · Quality products for over 45 years. · Minneapolis 2, Minn.

SHAFCO SUSPENDED OIL-FIRED UNIT HEATERS

"Up in the Air and Out of the Way"

WANT to cut new construction costs? Want to "add" 50, 100, even 200 feet of floor space to existing facilities? Then best you get acquainted with SHAFCO Suspended Oil-Fired Unit Heaters. They "hang" overhead . . . up in the air and out of the way . . . leaving space below free for useful, profitable occupation. And talk about heating efficiency! SHAFCO is tops! . . . 85% by actual tests . . . due to its exclusive, patented "counterflow" principle of air and heat. Installation? Quick and easy . . . because SHAFCO Heaters are compactly designed, simply assembled. Built-in plenum chamber eliminates makeshift "on-the-job" finishing. Heavy duty blower unit assures efficient heat circulation with minimum duct-work. Long-lasting? You bet! SHAFCO maintains the highest standard of quality throughout . . . with heavy gauge steel construction that really stands up under heat. No strains, no warping, no buckling! And SHAFCO Heaters have been thoroughly proved in use over 10 years successful application by major oil companies.

Models available from 100,000 to 400,000 B.T.U. to meet heating requirements of a wide range of commercial and industrial installations. Write today for the complete SHAFCO story.

"The best costs less regardless of price! Specify SHAFCO!"

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DISTRIBUTING CORPORATION
Division of SAWYER HEATING COMPANY

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Authorized representation Coast to Coast . . . provides on-the-spot installation service

Council Committee on International Relations, 29 W. 39th St., New York City. Canadian engineers will also be invited to participate, through the Engineering Institute of Canada. Participation will be recommended to all constituent societies of the Engineers Joint Council. Bogota, Colombia, has been suggested as the place for the first congress.

Previously Announced Meetings and Conventions

Fifth All-Industry Refrigeration and Air Conditioning Exposition, January 26 to 29, Cleveland—sponsored by the Refrigeration Equipment Manufacturers Association.

Eighth International Heating, Ventilating, and Air Conditioning Exposition, February 2 to 6, Grand Central Palace, New York City—under the auspices of the American Society of Heating and Ventilating Engineers (for additional details see the show section in this issue).

American Society of Heating and Ventilating Engineers, 51 Madison Ave., New York City—54th annual meeting, February 2 to 5, Hotel Commodore, New York City (see special show section in this issue for details).

National Association of Corrosion Engineers, 67 Wall St., New York 5, N. Y.—fourth annual conference and exhibition, April 5 to 8, Jefferson hotel, St. Louis, Mo.

Oil-Heat Institute of America, 6 E. 39th St., New York 16, N. Y.—silver anniversary convention and exposition, April 5 to 8, Chicago Coliseum.

The 10th Annual Midwest Power Conference—sponsored by the Illinois Institute of Technology, 3300 S. Federal St., Chicago, in cooperation with nine midwestern universities and eight engineering societies, April 7 to 9, Sheraton hotel, Chicago.

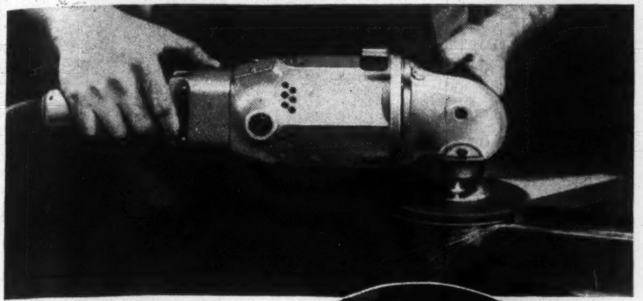
The 1948 Western Refrigeration Educational Exhibit and Conference—sponsored by the Oakland and Golden Gate chapters of the Refrigeration Service Engineers Society, April 30, May 1 and 2, Palace hotel, San Francisco.

American Foundrymen's Association, 222 W. Adams St., Chicago—52nd annual convention and foundry show, May 3 to 7, Philadelphia Convention Hall.

Heating, Piping, and Air Conditioning Contractors National Association, 1250 Avenue of the Americas, New York City—59th annual convention, June 1 to 5, Hotel William Penn, Pittsburgh.

American Society for Testing Materials, 1916 Race St., Philadelphia—1948 annual meeting and Eighth Exhibit of Testing Apparatus and Related Equipment, the week of June 21 to 25, Book-Cadillac hotel, Detroit.

Black & Decker SANDERS DO ALL 3 FASTER!



1 Sand Any Surface . . . With abrasive discs, Black & Decker Portable Electric Sanders speed up sanding of any surface from fast metal removal to satin-smooth finishing.

2 Grind Any Metal . . . With saucer or cup-type grinding wheels, Sanders remove excess metal; do a speedy job of "V-ing out" joints to be welded; smooth welded surfaces.

3 Speed Wire Brushing—With B&D "Whirlwind"* Wire Cup Brushes, Sanders take off old paint, rust, scale; clean tanks, boilers, furnaces, sheet metal and soldered joints; prepare surfaces for welding.

*Trade Mark Reg. U. S. Pat. Off.

Ask Your Nearby Black & Decker Distributor for full information on these labor-saving tools. For details on Sanders and many other Portable Electric Tools for heating, piping and air conditioning work, write for our catalog to: The Black & Decker Mfg. Co., 628 Pennsylvania Ave., Towson 4, Md.

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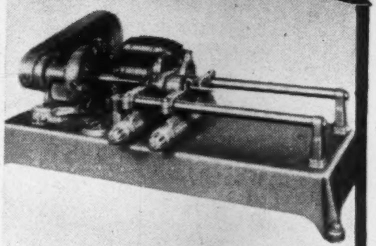
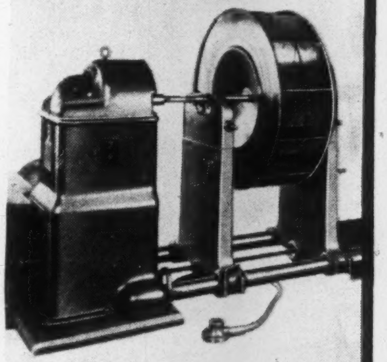
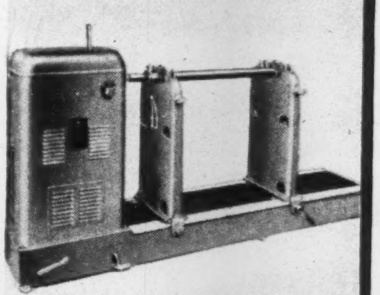
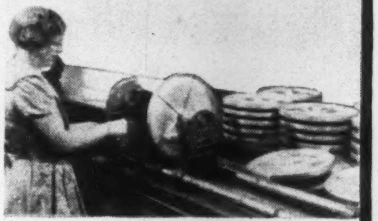
read these USERS' answers to your question









Get complete information on Bear Dy-Namic and Static Balancers. Write for the FREE Industrial Bulletin TODAY!

"We are Bear-Balancing 160 to 170 armatures a day. Service calls have been reduced to an absolute minimum."

"Bear Dy-Namic Balancing has greatly increased bearing life and eliminated vibration on our Centrifugal Fan Wheels."

"Vibration has been completely eliminated from our 21 inch blower wheels. We have had no difficulties with vibration or noise since we installed our Bear Dy-Namic Balancer."

Our Bear Dy-Namic Balancing Machine is doing an excellent job in balancing all types and sizes of Dynamotors, Converters and Generator armatures."

"Bear Balancing has increased the efficiency of our band saw wheels. There is a noticeable difference after balancing. We find they run much smoother and quieter after balancing."

2608

BEAR MFG. CO., Dept. H-16, Rock Island, Ill.

BEAR

COMBINATION

STATIC AND DY-NAMIC BALANCING MACHINES

a really COMPACT valve

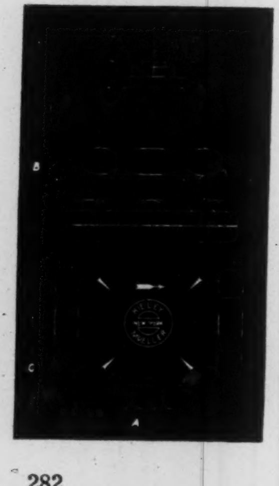
FOR "CLOSE-TOLERANCE" STEAM REGULATION

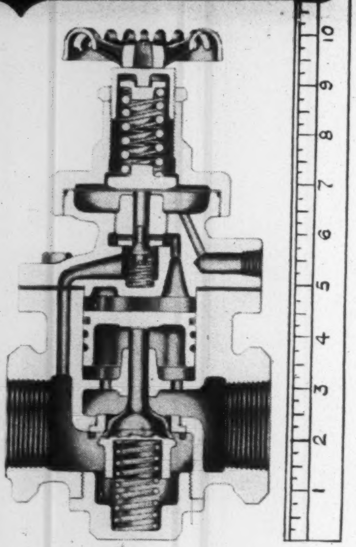
Where close regulation of steam pressure is important — and space-saving a big advantage — K&M's Type 481 is the valve to use. It's an internal pilot-operated pressure-reducing valve designed to meet just such requirements.

Type 481 is widely used in industrial process services, in marine applications, and as a primary valve on two-stage reductions for heating. Changes in pressure reduction are made by a simple setting of the handwheel.

DIMENSIONS

Valve Size (Inches)	½" ¾" 1"	1¼"	1½"	2"
A	4	5	6	6
B	7⁵⁄₁₆	7¾	8½	8½
C	1¾	2⁷⁄₁₆	2¹³⁄₁₆	2¹³⁄₁₆





PARABOLIC INNER VALVE insures reliable control on high or low load requirements.

SINGLE-SEAT DESIGN insures tight shut-off on dead-end services.

EASY MAINTENANCE All working parts easily removable and renewable without removing valve body from line.

Write for full technical details — and for the 100-page Kieley & Muller catalog. "Automatic Equipment for Pressure and Level Control."

KONTROL KIELEY & MUELLER MOTOR
NORTH BERGEN N.J.

RECENT TRADE LITERATURE

For your convenience in obtaining copies of these bulletins, see coupon on page 241. If you write direct to the manufacturer, describe carefully what literature you want, as the number given first in each item is for use only when sending requests to Heating, Piping & Air Conditioning.

Air Conditioning in Government Buildings

No. 6729—Air Conditioning in Government Buildings is the leadoff article in the Vol. 3, No. 4 issue of the house organ published by Anemostat Corp. of America, 10 E. 39th St., New York 16, N. Y. Briefly discussed are such aspects as building design, the quality of conditioning, humidity control, outside air capacity, reheat control, ducting, and the importance of air distribution. Also included in this issue is part one of an article on sound control, giving information on sound characteristics, physiological and psychological factors, and units of sound.

Arc Welders

No. 6730—Hobart Brothers Co., Troy, Ohio, now has available a new 36 page catalog containing illustrations, dimensions, specifications, and descriptions on its line of "Simplified" arc welders which include electric motor driven d-c units in five sizes (150 to 600 amp), gasoline engine driven welders in four sizes (200 to 600 amp), a-c transformer type welders in three sizes (200 to 500 amp), welding generators only in four sizes (150 to 400 amp), gasoline engine driven welders with auxiliary a-c or d-c power generators, and other models in all sizes for special applications. Also listed is the company's line of electrodes and accessories.

Combination A-C D-C Welder

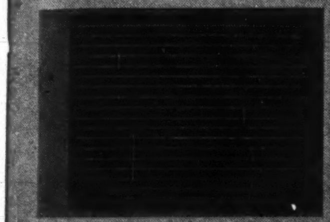
No. 6731—A combination a-c and d-c welder is briefly covered in a single page leaflet which provides data on the welding ranges and open circuit voltage of three models. The manufacturer is John A. Kern Co., 224 N. Loomis St., Chicago 7, Ill.

Copper Alloys

No. 6732—Many new copper base alloys have recently been developed by the brass mills, according to the November 1947 issue of the Bulletin, published by the Copper & Brass Research Association, 420 Lexington Ave., New York City. Among the alloys described in this 16 page booklet are (1) a 5 percent aluminum bronze said to offer good bearing qualities and excellent corrosion resistance to the impingement type of attack, (2) cadmium copper, (3) free cutting phosphor bronze, (4) free cutting nickel phosphide bronze, (5) silicon aluminum bronze, (6) tellurium copper, and (7) beryllium copper. Properties and characteristics of these alloys, together with some of the many industrial uses, are described in the booklet.

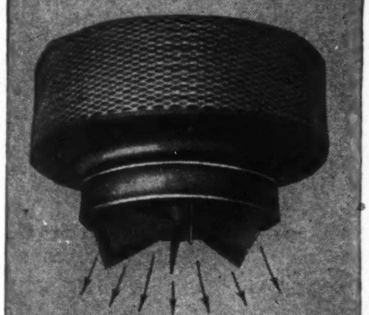
McCORD
HEATING AND AIR CONDITIONING PRODUCTS

BLAST HEATING COILS—AIR CONDITIONING COILS—ALL TYPES



All copper spiral fin tube construction with the tubes formed or bent permits uniform expansion without strain. Headers are heavy wall construction with tubes brazed into extended ferrules formed in the headers. Fins are helically wound and metallically bonded. May we send catalog?

VERTICAL TYPE UNIT HEATERS



A proven heating unit, modern in design, incorporating every unit heater advancement. McCord copper spiral fin tube construction creates air turbulence without undue restriction. Improved fan blades deliver large volume of air with minimum air noise. Guaranteed for 150 lbs. saturated steam pressure. Specify McCord.

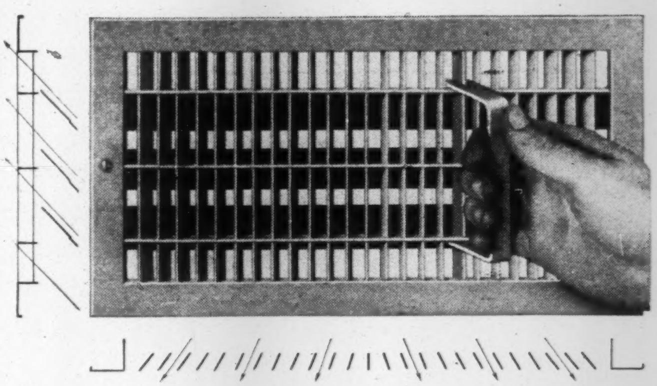
HORIZONTAL TYPE UNIT HEATERS

A time proven heating unit, modern streamlined in design, quiet, yet its rugged construction adapts it to all types of installations, guaranteed for use on No. 150 p. s. i. steam pressure. All copper heating element, individual spiral fin tubes free to expand without strain on joints. Standard motors with standard bases used. Wide range of capacities.

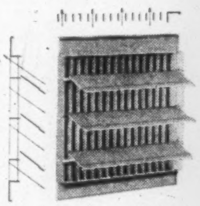
Save fuel with McCord Unit Heaters.

McCord CORPORATION
DETROIT 11, MICH.

INDEPENDENT
"Fabrikated" WALL GRILLES WITH DEFLECTING VANES



Style 321-A grille with deflecting vanes



Rear view showing adjustable deflecting vanes

ACCURATE and positive compound deflection of air flows can be readily secured with these "Fabrikated" grilles. Directional adjustments may be made when grilles are installed; or grille bars and vanes may be adjusted after installation to meet unforeseen or changed requirements.

Each grille bar and each deflecting vane is adjusted *individually* with a special two-pronged tool included with each shipment. Locking of grille bars and vanes is not required because they are held firmly in place — no vibration — no rattle.

Write for Our New Catalog No. 48!

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NATIONAL WARM AIR HEATING
INDOOR COMFORT
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Always Leading—Always Progressing

THE INDEPENDENT REGISTER CO.
3747 E. 93rd STREET · CLEVELAND, OHIO

45 INDUSTRIES solve Venting Problems with TRANSITE INDUSTRIAL VENT PIPE

Survey shows plant engineers specify this asbestos-cement pipe for longer life, less maintenance

REPORTS FROM 45 industries indicate more and more plants rely on Transite Industrial Vent Pipe to carry off corrosive fumes, gases, vapors, dust, and smoke.

The reason, J-M engineers state, is that Transite Vent Pipe is made of asbestos and cement combined by a special process . . . has a high resistance to many corrosive conditions typical of industrial operations. Plants that formerly had to replace vent pipe at frequent intervals often get years of efficient service from Transite . . . with practically no maintenance costs.

Because this vent pipe is completely rustproof, it may be used for vents and stacks without protective painting. Light in weight and readily assembled, Transite Industrial Vent Pipe comes in sizes from 3" to 36" in diameter. A full line of Transite fittings assures corrosion resistance throughout the system.

J-M engineers will be glad to consult with you about the use of Transite Industrial Vent Pipe as a possible solution to your venting problems. Ask for Data Sheet series, DS-336. Johns-Manville, Box 290, New York 16, N. Y.

A typical installation of Transite Industrial Vent Pipe venting corrosive gases, vapors and fumes from a large industrial plant.

JOHNS-MANVILLE JM PRODUCTS

Typical Industries in which Transite Industrial Vent Pipe is used

- Aircraft
- Automobile
- Baking
- Bleaching
- Boiler Works
- Brewing
- Canning
- Ceramic
- Chemical
- Dairy
- Drug
- Electrical
- Explosive
- Farm Machinery
- Food
- Foundry
- Furnace
- Furniture
- Gas
- Glass
- Laboratory
- Laundry
- Leather
- Meat Packing
- Metal
- Mining
- Paint
- Petroleum
- Potash
- Pulp & Paper
- Quarrying
- Railroad
- Rayon
- Refrigeration
- Rubber
- Sewage Works
- Shipbuilding
- Shoe
- Smelting
- Soap
- Soft Drink
- Sugar Refining
- Textile
- Tool
- Water Works

Desiccant for Static And Dynamic Dehumidification

No. 6733—"S/V Sovabead" is a new desiccant, essentially a form of silica gel but with modified chemical composition, which is offered for both static and dynamic dehumidification by the Special Products Div., Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y. Technical data, as well as a general description and a discussion of applications, are given in two new booklets.

Technical bulletin T-21 covers its use in static dehumidification and gives information on its composition, specification compliance, physical characteristics, water vapor adsorptive capacity, and reactivation characteristics. Data are given for calculating the amount of desiccant to be used for protecting packaged material, and its use in the drying of gases, refrigerants, and various liquids is briefly described.

Technical bulletin T-17 contains data, design procedures, and example calculations for using this desiccant in dynamic dehumidification. A good deal of space is devoted to application data including information on the relation between air flow and pressure drop through beds of the material, drying cycles, and the break point capacity at various relative humidities. Three example problems are worked out.

Forced Air Register

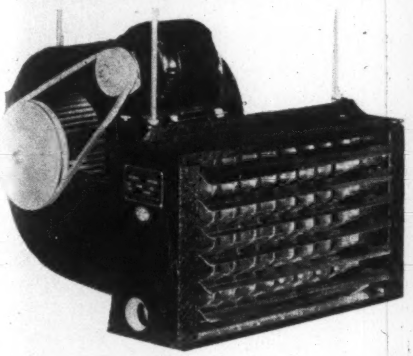
No. 6734—Minneapolis-Honeywell Regulator Co., 2604 4th Ave., S., Minneapolis 8, Minn., has announced a nationwide consumer promotional campaign designed to tie in the wholesalers, jobbers, and dealers with consumer advertising of its forced air register. As a part of this campaign, the company has prepared a four page folder describing the register which has a curved grille.

Gears, Speed Reducers Couplings, and Power Drives

No. 6735—Bulletin 10,000, released by the Falk Corp., 3001 W. Canal St., Milwaukee 8, Wis., describes and illustrates all of the company's products such as gears, speed reducers, "Motoreducers," couplings, high speed drives, backstops, marine drives, and special gear drives. Available services and facilities including steel casting, machining weldments, and engineering are also described.

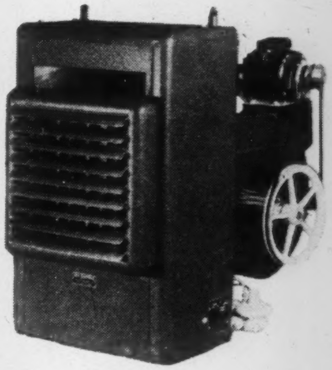
Heating, Conditioning and Cooling Applications

No. 6736—Use of the company's convector-radiators in a nurses' home, the application of air conditioning equipment in the optical shop of an instrument manufacturer, and the installation of refrigeration equipment to furnish chilled water for cooling dough mixers in a bakery are described and illustrated in the Vol. 11, No. 7 issue of the house organ published by The Trane Co., La Crosse, Wis. The use of down-flow unit heaters and fin type wall heaters in heating a factory building of saw tooth construction is also briefly described, as is the company's new AA "Climate Changer," designed for small multiple unit application in apartments, hotels, tourist courts, etc.



IMMEDIATE DELIVERY

HASTINGS
STEAM and GAS
CENTRIFUGAL UNIT HEATERS



CHECK THESE FEATURES OF OUTSTANDING SUPERIORITY

- EXTREME SILENCE IN OPERATION.
- MAY BE USED WITH DUCTS UP TO ¼" SP.
- COMPLETE CONTROL OF AIR DISTRIBUTION
- VARIABLE SPEED V BELT BLOWERS.

Dual directional louvers. Stainless steel horizontal and vertical louvers are individually adjustable.

- **STEAM UNITS**—Heating elements are 100% copper bonded fin and tube construction. Guaranteed for 150 lbs. steam pressure.
- **GAS UNITS**—Highly perfected stainless steel ribbon type burners for maximum efficiency. 16 gauge steel tubes for long life. Finest construction thruout. Equipped for Natural, LP, or Manufactured Gas.

WRITE FOR INFORMATION AND PRICES

We solicit your inquiries on our centrifugal unit heaters. Our special plan will help you place a trial order so that you can personally compare these units to others. We are confident that you will be convinced that they are of the finest construction and a valuable addition to your line.

1948 will be our fifteenth year in the manufacture of a most complete line of Air Conditioning Equipment. HASTINGS AIR CONTROL Units are designed for use with chilled or well water, and are now available with DX coils. Our equipment has been one of the most profitable lines in the industry. It will pay you to investigate.

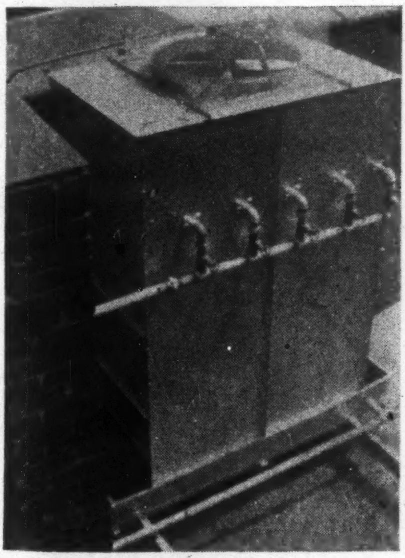
Hastings AIR CONTROL "THE FRESH AIR SYSTEM" AIR CONDITIONING

Hastings Air Conditioning Co., Inc.
HASTINGS, NEBR.

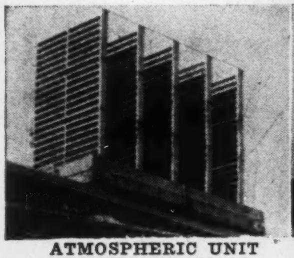
Hastings AIR CONTROL "THE FRESH AIR SYSTEM" AIR CONDITIONING

TRAY COOLING TOWERS

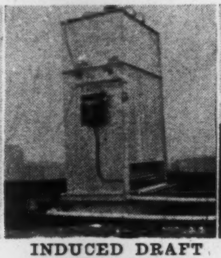
SAVE 98% of CONDENSER WATER COSTS wasted thru REFRIGERATION and AIR CONDITIONING PLANTS



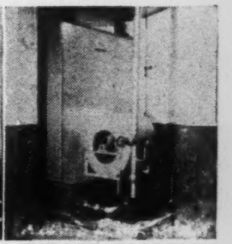
COOLING TOWER ABOVE—40 Tons Refrigeration Capacity. 120 GPM. Induced Draft—Outdoor Unit.



ATMOSPHERIC UNIT WORCESTER, MASS.



INDUCED DRAFT COOLING TOWER, PHILA., PA.



INDOOR COOLING TOWER, BROOKLINE, MASS.

TRAY COOLING TOWERS *offer*

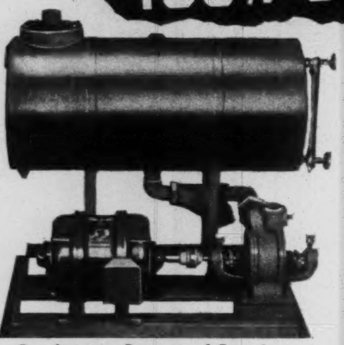
- ★ ALL STEEL CONSTRUCTION
- ★ PACKAGE UNITS—REQUIRE LESS SPACE
- ★ OPEN DISTRIBUTOR HEADER—NO NOZZLES requires less horsepower for recirculating pumps.
- ★ INDOOR and OUTDOOR UNITS

Send for
BULLETIN H-48

Some open territory for factory representatives

NEW ENGLAND COOLING TOWER CO.
88 Broad Street
BOSTON 10, MASS.

100% efficiency



. . . SAVE STEAM LOSS

through the—

SKIDMORE SYSTEM

Condensate Pump and Receiver
Model TM, High Pressure Turbine Type

TAKE full advantage of all possible steam loss! The Skidmore High Pressure Turbine Type Pump is designed to give perfect performance for laundries, packing plants, canneries and similar installations. This pump is suited to pressures up to 150 pounds and boilers up to 250 Horse Power.

For further information, write today for bulletin No. 17 H. P.

Ask about our complete line . . . we may build a pump for your purpose.

SKIDMORE PUMPS

NOW READY!
. . . GREATER EFFICIENCY
. . . LOWER MAINTENANCE

Model No. HS

- LOW COST
- LOW UPKEEP

Designed to give 100% efficiency.

This new type H S Pump is the result of experience and research of the war years. The H S Condensate and Boiler Feed Pump is very dependable, and will operate at a wide range of pressures, handling the condensate requirements very satisfactorily from steam heating systems and process equipment.

For further information, write today for bulletin No. 14 A-HP.

Designers and manufacturers of quality pumps for over a quarter of a century.

SKIDMORE PUMPS

ST. JOSEPH, MICHIGAN

Indicating Recorders And Controllers

No. 6737—Catalog ND44(2), issued by Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa., is devoted to all of the company's "Micromax" model R indicating recorders and controllers. Instruments to measure temperatures through the use of the thermocouples, "Rayotubes," and "Thermohms," together with units to measure other quantities such as frequency, gas analysis, electrolytic conductivity, and pH are included. Specifications in tabular form are given and suggested chart numbers are listed for the more commonly used ranges.

Industrial Floats

No. 6738—Chicago Float Works, Inc., Dept. T, 2330 S. Western Ave., Chicago 8, Ill., has announced a new issue of its catalog describing the copper, monel, steel, and stainless steel industrial floats offered by the company. Data for buoyancy and volume calculations and diagrams of standard connections used with float valves and liquid level controllers are included. Also pointed out in the booklet is the company's service in the preparation of detailed recommendations for individual requirements.

Industrial Thermostats

No. 6739—An extensive line of "Thermoswitch" thermostats for many commercial and industrial applications is covered in a new catalog issued by Fenwal, Inc., Ashland, Mass. Principles of operation, price lists, and

Ball Bearings for AIR CIRCULATING UNITS...FANS and BLOWERS

Silence
GREASE FITTING
RUBBER INSULATION
PRECISION BEARING
METAL BASE
LOOK

SILENCE ASSURED with EDR RUBBER-INSULATED BALL BEARING PILLOW BLOCK

This sound-insulated Ahlberg ball bearing pillow block provides silent anti-friction efficiency. It is the ideal light pre-lubricated bearing for air conditioning equipment, fans, furnace blowers, etc.

Its precision, quiet-running ball bearing is completely cushioned and insulated from the metal housing with synthetic rubber. The frictionless, labyrinth-type seals retain the lubricant and protect the bearing.

Write for complete details and prices covering this low-cost silent ball bearing pillow block.

Ahlberg Bearings

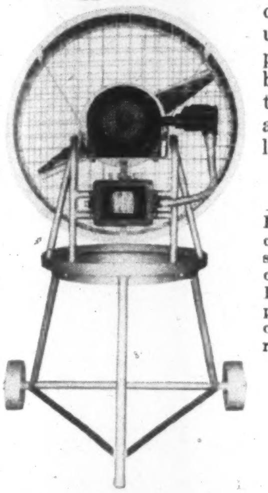
3081 WEST 47th STREET • CHICAGO 32, ILLINOIS

SOUTH BEND
SOUTH BEND AIR PRODUCTS INC
INDIANA

Aerospot and Dynaflow

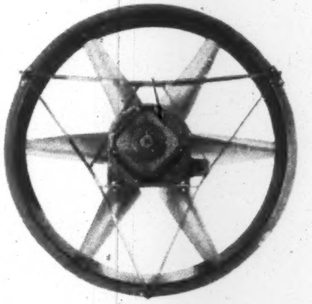
FANS FOR EVERY INDUSTRY

Aerospot and Dynaflow Fans rate high in efficiency and safety features and offer advanced aerodynamic design and rugged construction. The models shown are in most demand for Industrial use. Any unit may be furnished with explosion-proof motor and fan blades. For complete specifications, and listings of other fans available, write for our new catalog today!



HEAVY DUTY AEROSPOT

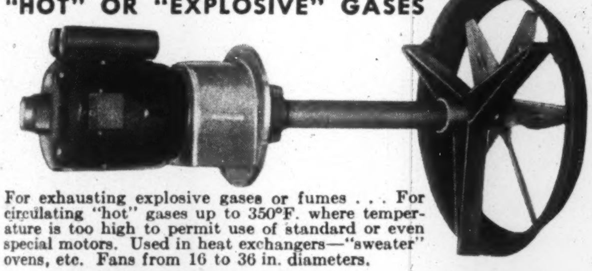
For general or specific ventilation, man-cooling, or parts-cooling—to increase personnel efficiency and decrease lost time in cooling and drying hot parts. Portable. Direction of blast adjustable. Explosion-proof motor, metal conduit and starter can be supplied. Conforms to state safety regulations.



DYNAFLOW UNITS 2-4-6 BLADE TYPES

Six Blade model illustrated. For exhausting or blowing against high static pressures. For general ventilation or specific processes where fumes are present. Sizes: 16 to 36 in. dia. Capacities: 1240 to 26000 c.f.m. Two and four blade models for applications at lower static pressures.

EXTENSION ARM DYNAFLOW FOR "HOT" OR "EXPLOSIVE" GASES



For exhausting explosive gases or fumes . . . For circulating "hot" gases up to 350°F. where temperature is too high to permit use of standard or even special motors. Used in heat exchangers—"sweater" ovens, etc. Fans from 16 to 36 in. diameters.

DUCTYPE UNITS

Direct Drive or Belt Drive

Direct drive model shown; also supplied with belt drive for high temperatures or corrosive air and gas handling. Designed for bolting in any duct run at any point or at either end. Sizes 16 to 36 in. fans.

SOUTH BEND AIR PRODUCTS, INC.
322 EAST COLFAX AVENUE • SOUTH BEND, INDIANA

NOW A Complete Line of *Aircor*

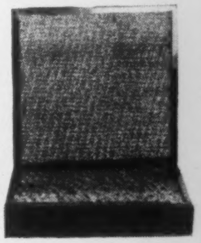
AIR FILTERS FOR

Commercial, Domestic and Industrial Use

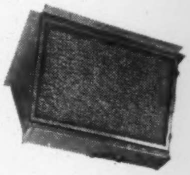
Aircor Air Filters For Air Conditioning, Ventilating Systems

A permanent, cleanable viscous type air filter with special AIRCOR filter mesh design that traps more dust through complete depth while providing a minimum of air resistance. Galvanized, cramped, expanded metal screen deflects air stream, acts as lint arrestor, an aid for quicker, easier cleaning. Heavy gauge galvanized steel frame has full welded corners and drain slots for cleaning. Rated filtering efficiency 98.5%. Standard 1″ and 2″ widths. Send for Bulletin 1245A for further information.

Aircor Industrial Filters For Extra Heavy Duty



Specially designed for heavy duty service on industrial applications, this permanent type AIRCOR air filter has high dust holding capacity, low initial resistance and low rate of increase in static pressure. Sturdily constructed filter media protected by expanded metal screen which deflects air stream and arrests lint to provide quicker, easier cleaning. In 2″ and 4″ thickness. Bulletin 146.



Aircor Grease Filters

Permanent, cleanable type AIRCOR Grease Filter specially designed to remove grease from exhaust ducts—a necessity in kitchens and galleys. Increases working comfort, decreases *fire hazard*, protects motors and brushes and lengthens life of mechanical equipment. Standard size 2″ thick. Assemblies available for mounting on ceiling or wall, single or multiple units. Bulletin 346.

Aircor Holding Frames

Engineered holding frame design provides greater filtering capacity with a minimum of space. Compact, sturdy, extremely strong and rigid this frame construction also simplifies filter removal and cleaning. Assembles to any height or width. Fireproof lining on back flange offers extra protection against air leakage. Available in V-type or straight banks. Adaptable to special requirements. Bulletin 600.

- **Write Air Filter Corporation for complete bulletins, specifications, test and performance charts on AIRCOR Air and Grease Filters. Engineering assistance given on special problems.**

Aircor
Air Filter Corporation
2514 P-W. Lisbon Ave. · Milwaukee 5, Wis.

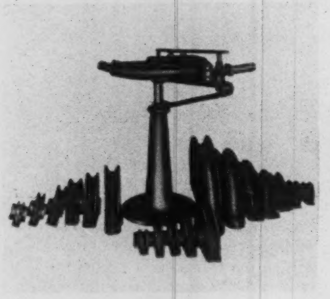
Canadian Representatives: Douglas Eng. Co., Ltd., Montreal

Use "American"

PIPE BENDING MACHINES . . .

for fast, dependable bends

Radiant HEAT Pipe Bending is simple, accurate with good equipment . . . hand or motor-powered machines available . . . up to 8" capacities.



The Hand-powered "American" A-30

Bends ½" to 2" standard pipe sizes to a radius of 5 to 1, up to 180°. Special radii within these sizes supplied on request. Usual radiant heat bends for 1¼" at 6" & 9" radii can be supplied. Special radius supplied on request.

- Average bend takes only 60 seconds!
- Versatile—bends cold pipe, conduit and tube, copper and brass I.P.S. without crimping.
- 12,000 in use all over the world.

BENT ONCE — BENT RIGHT
ON "AMERICAN" PIPE BENDING MACHINES

American
PIPE BENDING MACHINE
Company INC.

Factory and Main Office: 17 Furnace St., Poultney, Vermont

design, application, and construction features are included. A considerable amount of space is devoted to information on lag and overshoot, process characteristics, differentials and temperature variation, and checking control systems under operating conditions.

Line Type Air Distribution Outlet

No. 6740—"Line-O-Flo" air distribution ceiling outlets, which can be used with fluorescent lighting units as an integral part of the assembly, are described and illustrated in a new 12 page bulletin issued by Barber-Colman Co., Rockford, Ill. Two models, in three styles each, which may be used either as supply or return units, are described.

Manometers, Draft and Filter Gages

No. 6741—A new series of illustrated bulletins on draft and filter gages and manometers has recently been published by F. W. Dwyer Mfg. Co., 317 S. Western Ave., Chicago 12, Ill. Plastic tube manometers are featured in Bulletin No. 171. The new transparent hook gage is covered in Bulletin No. 176, and air filter gages are described in Bulletin No. 187. The company's portable and stationary draft gages are the subjects of Bulletin No. 205, and Bulletin No. 165 gives useful information on air flow and the use of the company's Pitot tube.

Positioners and Turning Rolls

No. 6742—Positioners for facilitating and speeding up welding, grinding, hard surfacing, repairing, etc., together with turning rolls for speeding production of

Don't Miss the EAGAN PUMP EXHIBIT

at the Heating and Ventilating Show, February 2 to 6
GRAND CENTRAL PALACE, NEW YORK CITY

. . . including representative models of

EAGAN . . .

PUMPS

CONDENSATE
BOILER FEED
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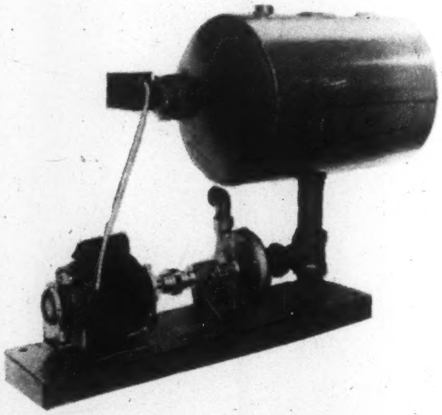
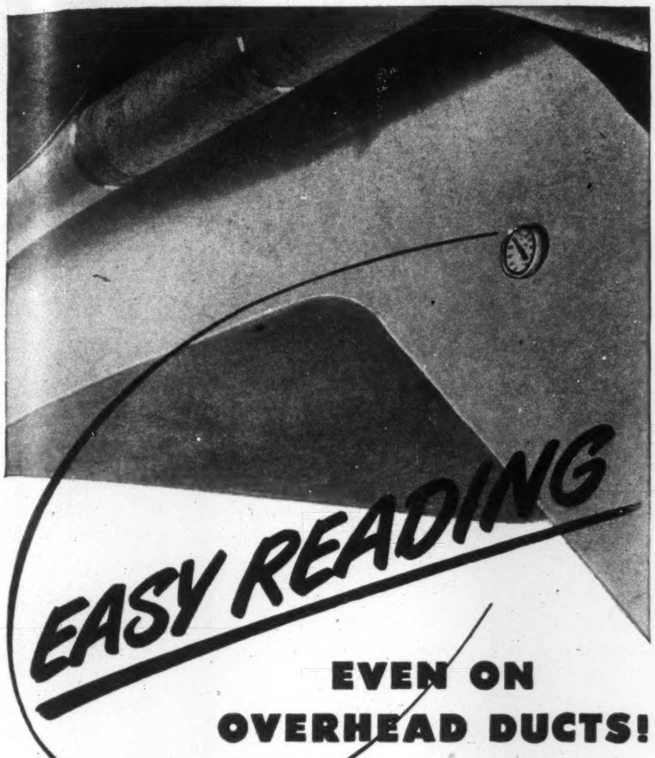
TURBINE
CENTRIFUGAL
. . . PUMPS



Write for Bulletins

WALTER H. EAGAN CO.
2336-38 FAIRMOUNT AVENUE, PHILADELPHIA, PA.



EVEN ON OVERHEAD DUCTS!

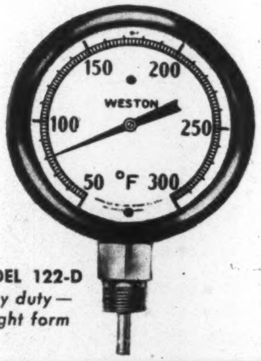
WESTON

all-metal

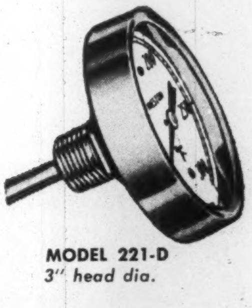
THERMOMETERS

Clear, boldly marked scales make Westons preferred on overhead ducts and other inaccessible locations. Easily mounted at any angle for convenience in reading. Sturdy, all-metal Weston construction assures years of accurate dependability.

Available in sizes, ranges and stem lengths for most applications. Ask your local jobber or Weston representative for complete information. Weston Electrical Instrument Corporation, 648 Frelinghuysen Avenue, Newark 5, New Jersey.



MODEL 122-D
heavy duty—
straight form



MODEL 221-D
3" head dia.

Plan
greater safety & efficiency
into your new buildings with
Swartwout
Controlled Air Circulation

HERE'S the equipment—and the engineering assistance—needed by ventilation contractors and engineers for solving practically all industrial air movement problems. Swartwout builds sturdy, scientifically designed roof ventilators for either gravity or power systems, and modern louvers for fresh air intake. Write for new Bulletin 324.

THE SWARTWOUT CO. 18568 Euclid Ave. Cleveland 12, O.

Swartwout AIRMOVER
Most modern large scale ventilation equipment. Only 32 inches high, features short air travel, large capacity, economical cost.

Swartwout-Dexter Heat Valve
Continuous opening ventilator providing natural draft plus outside air suction. The original ridge type ventilator.

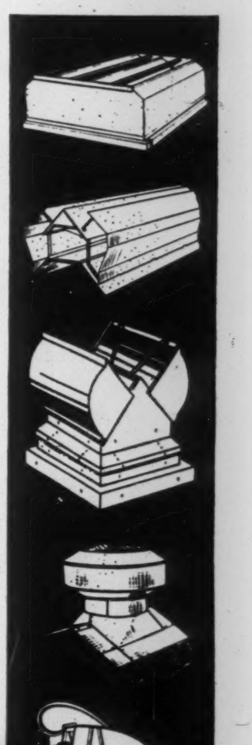
JECT-O-VALVE
Efficient "straight-through" type provides powerful exhaust for unusually tough ventilating needs.

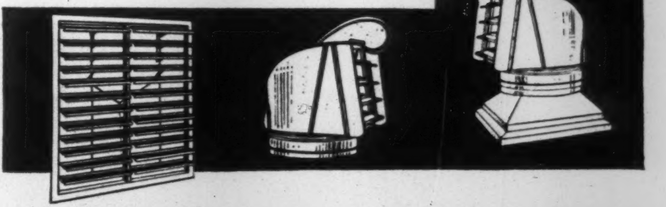
AIRVALVE
A highly efficient round-type ventilator for many uses where economical equipment is desirable.

AIRJECTOR
Power ventilator built on the rotary principle. Combines low cost power air movement and gravity flow with wind suction.

ROTARY
For many years industry's most popular type ventilator. Swings on permanently oiled sealed ball bearings.

INTAKE LOUVERS
The ideal modern method of providing fresh air in commercial and industrial buildings. To get hot bad air **out**, let fresh air **in**.





Swartwout
Controlled **Air Circulation**

EQUIPMENT FOR EFFECTIVE ECONOMICAL VENTILATION OF INDUSTRIAL BUILDINGS

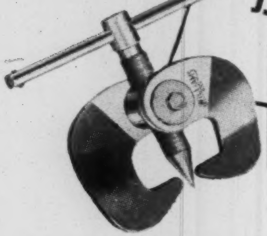
REPLACE GASKETS QUICKLY . . . EASILY

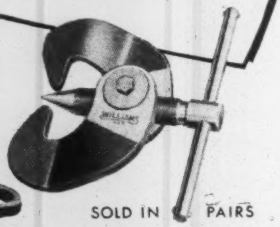
Williams FLANGE-JACKS, formerly manufactured by T. J. Persson Co., Bloomfield, N. J., eliminate long, costly shut-downs for gasket replacements. Ease of operation permits speedy separation of flanges regardless of location. Operating with a minimum of effort even in tight, cramped quarters, FLANGE-JACKS exert tremendous pressure evenly and smoothly . . . without shock along the pipe line. Bolt holes are securely held in perfect alignment and flange faces cannot be damaged. See your distributor for trade discounts on these fully patented tools.

J. H. WILLIAMS & CO.
BUFFALO 7, N. Y.

Standard No. 20
$24.00 pr.

Giant No. 30
$48.00 pr.





SOLD IN PAIRS

WILLIAMS Flange-Jacks

AIR-FLO
MODEL
A-555
AUTOMATIC SHUTTER
WEATHER-SEALED

FRONT VIEW--CLOSED

leads the field in features!

There is every reason why you should use AIR-FLO shutters on your jobs. New heavy reinforcement strip adds strength and long life to the louvers, assures quiet operation and perfect counterbalance, prevents rattling. Aluminum louvers open fully, permitting capacity fan operation. Deep shroud protects shutter from high winds. Tie-rod, brackets and bearings inside frame, not exposed to weather. Special finish resists corrosion. Many other features. Write for illustrated catalog 42-D of the complete AIR-FLO line.

AIR CONDITIONING PRODUCTS CO.
2340 W. LAFAYETTE BLVD. DETROIT 16, MICH.

tanks, drums, pressure vessels, etc. are described and illustrated in a four page folder released by the Industrial Div., Ransome Machinery Co., Subsidiary of Worthington Pump & Machinery Corp., Dunellen, N. J.

Registers and Grilles

No. 6743—A line of high velocity outlets and "Scoopaires," together with wall and baseboard registers is covered in Catalog 48 released by Stewart Mfg. Co., Inc., 612 Bloomfield Ave., Bloomfield, N. J. Diagrams and illustrations supplement the technical and price data.

Safety and Relief Valves

No. 6744—A new six page illustrated and condensed specifications bulletin (No. 50) on safety and relief valves has been released by Farris Engineering Corp., 494 Commercial Ave., Palisades Park, N. J. Feature of the folder is a detailed specification and index chart which, together with the 31 sectional drawings, gives a quick picture of the various types of valves available. A separate page is devoted to the nozzle valve features which are an integral part of the company's valve design.

Saturated Pressure-Temperature Relationships of Refrigerants

No. 6745—Two wall or desk charts covering the saturated pressure-temperature relationships of refrigerants have been compiled by Kinetic Chemicals, Inc., Wilmington 98, Del., and are available to the engineering profession, the refrigeration trade, and for classroom

2824 STAINLESS STOCK ITEMS
in P. P. & E. Stainless Steel Welding Fittings . . .

The most complete line ever offered—available in three Stainless Types (304, 316, 347) to match pipe and tubing of various wall thicknesses in sizes from 3/4" through 12"; in all standard fittings illustrated. Special fittings, and other analyses, can be supplied on special order

All P P & E. fittings are made of *forged* or *rolled* stock; annealed, blasted, and passivated for maximum corrosion resistance. Their use makes possible fabrication of every type of stainless piping system with minimum equipment simply by straight cutting of tubes to desired lengths, and plain butt welding.

The most complete line of Stainless Steel Welding Fittings
Send for Catalog S-309

STAINLESS ALLOY DIVISION
PITTSBURGH PIPING and EQUIPMENT COMPANY
10 43rd Street · Pittsburgh, Penna.
World's Largest Manufacturer of Stainless Steel Welding Fittings

Only FEDDERS
UNIT HEATERS
have all these features:

Streamlined copper tubes combine aerodynamic and heat transfer efficiency.

Deep flanges extruded into headers give abundant tube brazing area.

Individual copper fins have large-area bond to tubes.

Individual tubes "give" laterally to relieve expansion stresses between adjacent tubes.

Full floating element mountings relieve expansion stresses between core and cabinet.

Electrically welded cabinet provides rugged strength.

FEDDERS-QUIGAN CORPORATION
BUFFALO 7, NEW YORK

It's Naylor Light-weight Pipe

Here's the pipe structure that's ideal for ventilating and air conditioning jobs no other light-weight pipe can handle. Naylor's exclusive Lockseam Spiralweld provides the strength and safety you would expect only in a heavier-wall pipe. Sizes from 4 to 30 inches in diameter with all types of fittings, connections and fabrications.

NAYLOR PIPE COMPANY
1251 East 92nd Street • Chicago 19, Illinois
New York Office: 350 Madison Avenue • New York 17, N.Y.

GET THIS HELPFUL BOOKLET

"100 WAYS TO APPLY *Electric* HEAT"

see how you can
- INCREASE PRODUCTION
- SAVE TIME & MONEY
- IMPROVE QUALITY

CHROMALOX *Electric* HEATING UNITS

100 WAYS
to apply
ELECTRIC
HEAT
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It shows you how CHROMALOX Electric Heaters are efficiently and economically solving many of industry's toughest heating problems.

Write Today to:
EDWIN L. WIEGAND CO., 7610 THOMAS BOULEVARD, PITTSBURGH 8, PA.

CHROMALOX IB-58

ELECTRIC HEATING AT ITS BEST!

WHAT'S NEW?

in Welding Fittings

TUBE TURN
tt
Supplement

GET THIS BOOKLET—The Tube-Turn line of welding fittings is BIG, and still growing! This 20-page Supplement to TT Catalog No. 111 gives you data about important new items which, more than ever, make Tube Turns your *one source of supply for all welding fitting requirements.*

tt

TUBE-TURN—
T. M. Reg. U. S. Pat. Off.

TUBE-TURN WELDING FITTINGS AND FLANGES

District Offices at New York, Philadelphia, Pittsburgh, Detroit, Chicago, Houston, Tulsa, San Francisco, Los Angeles

Tube Turns, Inc., Dept. 2001, Louisville 1, Kentucky

Please send me a copy of Tube-Turn Catalog No. 111 Supplement.

Name..

Position..

Firm Name..

Street..

City............................*Zone*....*State*..................

work, or for those who have occasion to use such data.

According to the company, there has been a wide demand for suitable charts or curves which would cover not only the eight "Freon" refrigerants being currently produced, but also 18 additional chemicals that are being used or have been used in the past as refrigerants.

Chart 1 covers the temperature range from —40 to 250 F and chart 2 covers the range from —180 to 60 F with the pressure ranges of both charts from 29.72 in. mercury vacuum (0.10 psia) to 985 psi gage (1000 psia). The charts were prepared to permit more accurate and rapid temperature readings being made, and according to the manufacturer, wider fields of pressures and temperatures are covered than by any previous chart.

Melting points, critical points, and triple points are also shown on these logarithmic charts which are approximately 23 x 26 in.

Stainless Steel Welding Fittings

No. 6746—Approximately 2800 welding fittings for pipe and tubing and of types 304, 316, and 347 stainless steel are covered in a new catalog (No. S-309) published by Stainless Steel Alloy Div., Pittsburgh Piping and Equipment Co., 10 43rd St., Pittsburgh, Pa. Complete specifications and prices are given. Included are fittings to match various wall thicknesses in sizes from ¾ through 12 in.

Steam Distribution in Empire State Building

No. 6747—The featured article in the Vol. 2, No. 1 issue of the monthly publication of the Magnesia Insula-

Leaky Pipe Joints Cost You Money – Stop Them With KEY-TITE

KEY-TITE
WATER PROOF
PIPE JOINT
COMPOUND

Pipe joints sealed with Key-Tite save you money for they positively will not leak. It contains no lead or lead substitutes and does not affect the taste or odor of potable liquids. Key-Tite is a perfect seal on all lines carrying water, gas, low-pressure steam, compressed air, etc. Joints are easily opened, too, for it will not freeze in the joint.

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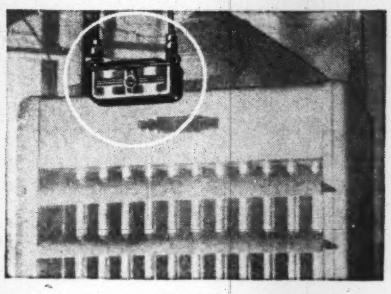
KEY Company

2617 McCasland Ave., East St. Louis, Ill.

AT LAST—You Can Maintain Adequate Humidity at LOW COST



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Promotes Health . . . Saves Fuel

We "hit the jackpot" with this new Atomick Humidifier . . . it's simple, practical, inexpensive to install, inexpensive to operate!

When used with unit heaters, the Atomick delivers a mist of water vapor directly into the warm air flow for as long as the unit heater is in operation (see cut above). Or it can be used independently with direct or indirect radiation.

Compressed air operated, a single spray head outlet atomizes up to 1¼ gals of water per hr.—the 4-head sprays 4 times as much.

Humid, vitalized heat means better health for employees, reduced fuel costs. Write for Bulletin 900 giving details and prices.

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AUTOMATIC HUMIDIFIERS FOR ALL TYPES OF HEATING SYSTEMS

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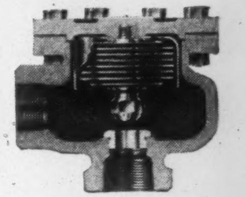
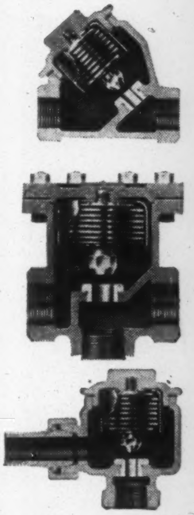
Are Steam Traps *Your* NO. 1 FUEL WASTERS?





These Nicholson Traps Are Cutting Loss to 1%

A comparative test of 14 different steam traps, recently conducted by a large manufacturer, showed Nicholson traps topped the field with a steam waste of only 1.04% against losses up to 14%. Findings also confirmed the unequalled drainage capacity of Nicholson traps, and their proof against freezing.

5 Types for Every Purpose

Sizes ¼" to 2", steam pressures to 225 lbs., for every heat, power, process application. For reasons for the increasing standardization on Nicholson traps send for BULLETIN 544 or see Sweet's.

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Valves ★ Traps ★ Steam Specialties

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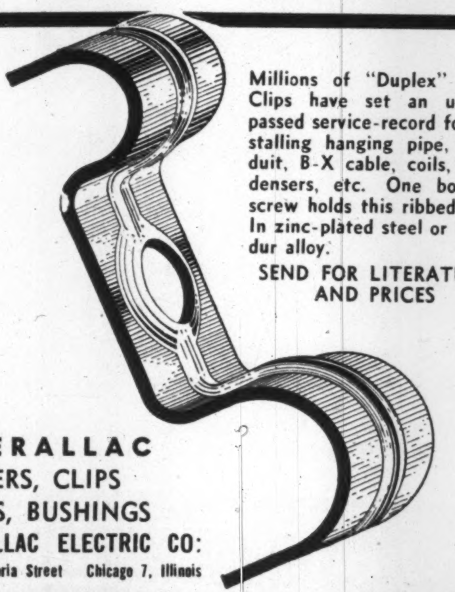

Millions of "Duplex" Jiffy Clips have set an unsurpassed service-record for installing hanging pipe, conduit, B-X cable, coils, condensers, etc. One bolt or screw holds this ribbed clip. In zinc-plated steel or Everdur alloy.

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For Vertical Shell and Tube Ammonia Condensers

ALL MARTOCELLO SPRAY NOZZLES are manufactured with precision and of a design which has been thoroughly tested for maximum results and durability. They are guaranteed to give satisfaction. Successful, efficient results depend largely upon selecting the proper number, type and size of Nozzles suitable for your installation.

THE MARTOCELLO CONDENSER WATER DISTRIBUTORS are now used as standard equipment by Progressive Refrigerating Engineers in solving their Manpower problem, because they require no attention and assure users of the lowest Condenser Operating Pressures and Minimum Power Cost.

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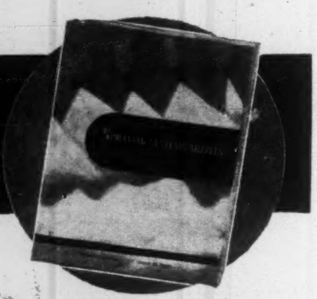
SPRAY NOZZLE INFORMATION
CATALOG NO. 22



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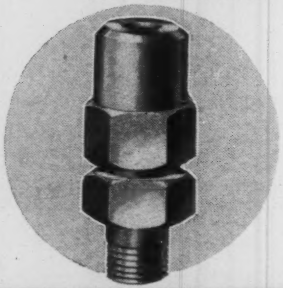

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Spray nozzles are made for every type of spraying operation. Nozzles in every capacity required. Advance design assures efficient operation and long service life.

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A BROWNELL MATCHED UNIT gives you all the benefits of mechanical firing . . . smokeless combustion; automatic regulation; fuel economy; saving of time, labor, and worry.

Brownell boilers and stokers offer you a wide range of selection to meet your requirements. Along with Brownell equipment goes competent engineering service.

The Brownell agent in your vicinity will be glad to give you full information. If you don't know his name and address, write us.

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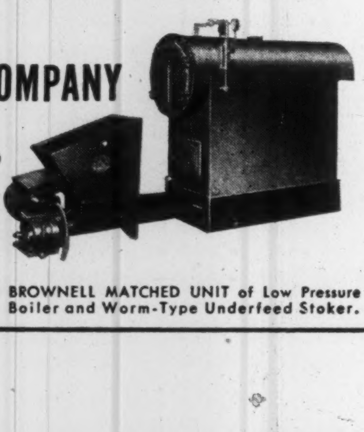

BROWNELL MATCHED UNIT of Low Pressure Boiler and Worm-Type Underfeed Stoker.

tion Manufacturers Association, 1317 F St., N.W., Washington 4, D. C., is by C. L. Brown, vice president in charge of operations, Empire State, Inc., who briefly describes the steam distribution system in the 102 story Empire State Building. Information is given on the three separate steam services (direct heating, hot water and restaurant service, and indirect heating), the zoning system used, and the application of 85 percent magnesia insulation. Also included in this issue is a brief discussion of permanent and removable flange insulation.

Steam Purifiers for Removing Moisture and Solids

No. 6748—Steam purifier units for removing moisture and solids in steam lines are described and illustrated in a new edition of the 12 page bulletin (Publ. 2725) issued by Cochrane Corp., 17th St. & Allegheny Ave., Philadelphia 32, Pa. The units are used for removing entrained oil and other solids that might otherwise render exhaust steam unusable in plant heating or other applications. Hook-up diagrams, application data, installation photographs, and accessory descriptions are included.

Temperature Regulators

No. 6749—Controlled Heat is the title of a new illustrated folder describing the class T, self contained temperature regulators offered by Leslie Co., 51 Delafield Ave., Lyndhurst, N. J. Features of the new regulators, as described in this folder, include single seated construction in all sizes for steam pressures up to 125 psi,

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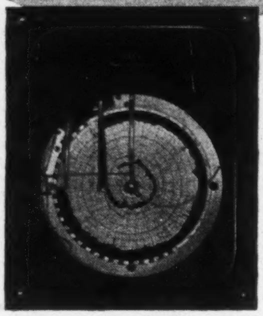

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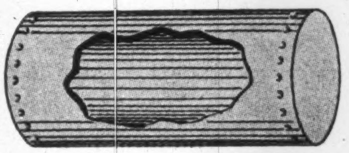

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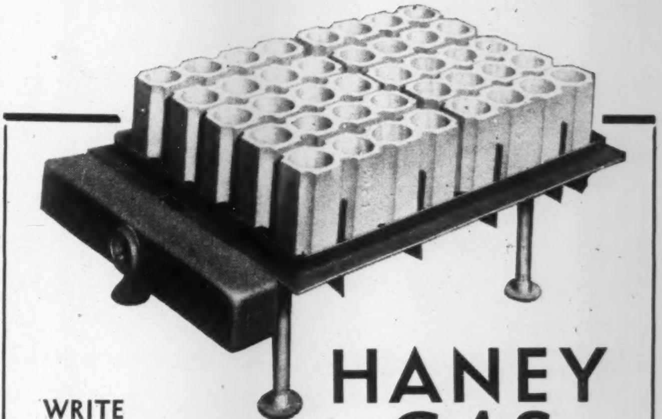

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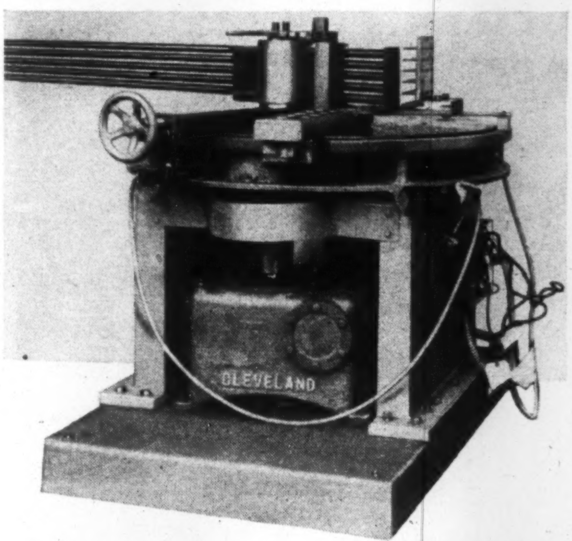

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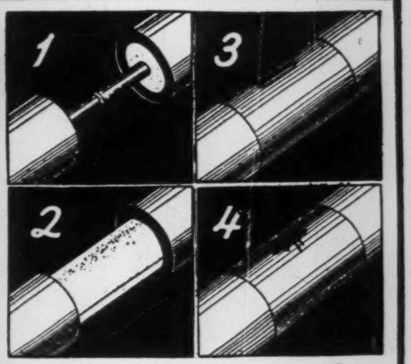

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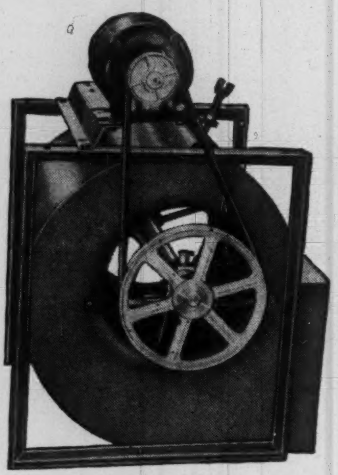

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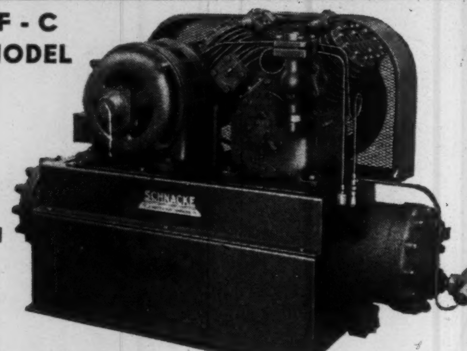
10 TO 25 H.P.



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the use of a packless main valve, together with a hard faced seating surface and hardened wearing parts. The thermostat element is liquid filled. Data on selection, installation, operation, and maintenance are included.

Thermocouples and Pyrometer Accessories

No. 6750—A new bulletin (No. P1235) covering thermocouples, protection tubes, and pyrometer accessories has been released by the Bristol Co., Waterbury 91, Conn. Specifications, detailed drawings, and prices, together with a chart for selecting the right thermocouple and protection tube are given.

Underfeed Stokers

No. 6751—Type L underfeed stokers for loads of 100 to 360 bhp and type H stokers designed to carry loads up to the maximum usually required of single retort ram type, side dump underfeed stokers are described and illustrated in a new 12 page bulletin issued by Erie City Iron Works, Erie, Pa. Approximate capacities, dimensions, and the automatic control system are covered.

Ventilating and Heating Equipment

No. 6752—A Philadelphia apartment project in which 136 "Climate Changers" were installed to deliver heated and filtered air to as many apartments is described in the Vol. 11, No. 5 issue of the house organ published by The Trane Co., La Crosse, Wis. Also described are the uses of the company's heating and ventilating equipment (including unit heaters, centrifugal fans, steam

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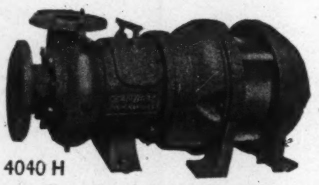
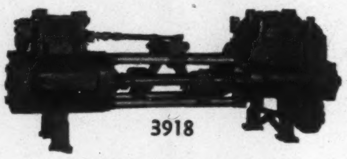


4040 H
Close Coupled Centrifugal Pump



3918
Durable Duplex, Packed Piston Pattern Steam Pump

Centrifugal Pumps
Turbine and Motor Drive Pumps for Handling Most Any Liquids and Service
Steam and Power Driven

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85.000 - 125.000 and 165,000 BTU Capacity. Available for Natural, Butane or Propane Gases.

Delivery within 3 or 4 days.

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We also manufacture a combination heating and cooling unit, gas fired furnace and the NAT "Self-Contained" Air Conditioning unit.

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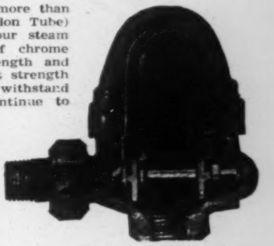
HAVE PROVEN THEIR
Merit Simplicity Durability

HAINES TRAPS have been manufactured for more than fifty years in which the Thermostat (or Bourdon Tube) has been perfected and is as accurate as your steam gauge. The operating member is made of chrome molybdenum steel tubing which assures strength and endurance. Haines Traps, due to the inherent strength of their design and construction, are able to withstand the - stress of excess pressures and still continue to function. In Haines Traps, the thermostat is subjected to the lower temperature of the return line. This permits of greater valve travel and a more positive draining of the unit to which the trap is attached. The thermostatic member is mounted vertically on a horizontal valve motion and closes the valve piece against the flow of steam. The end of the thermostatic member opposite the valve is anchored, hence the travel of the thermostat either opens or closes the valve. Due to the fact that the Thermostat is mounted outboard the valve piece, the Haines Trap controls a large valve opening, which enables it to handle large volumes of air and water and prevents it from becoming ineffective from scale or other foreign matters.

Haines Float & Thermostatic Traps are built for any low pressure installation up to 15 lbs. in the 3/4" and 1 1/4" sizes and 30 lbs. in the 1" size. They cannot become air bound and the Haines underslung principle insures safety . . . no danger of building up a pressure.



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F & T Trap

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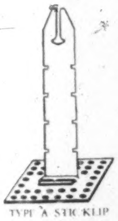
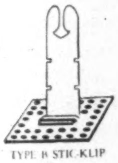
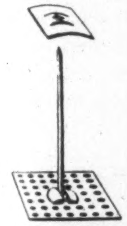


TYPE A STIC-KLIP



TYPE B STIC-KLIP



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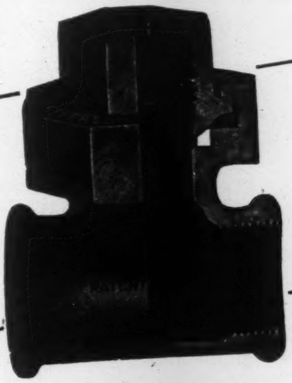

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WITH THE
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JEFFERSON SPECIALTY UNIONS

You can save yourself labor time by specifying and installing Jefferson Specialty Unions on your piping jobs. These union tees with the union on the outlet take the place of an all-female union, two nipples, and an ordinary tee, thus saving three joints and much assembly labor. Available in All-Female and Male and Female threads.

An exclusive feature of Jefferson Specialty Unions is the recessed brass seating which is located away from the runway of the fitting and leaves a straight bore assuring unrestricted flow in the pipe.

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specialties, and heating coils) in administrative places, workshops, and maintenance buildings of the Ames Laboratory of the National Advisory Committee for Aeronautics, located at Moffet Field, Calif. In addition to describing other applications of the company's products, the booklet covers the new unit ventilator.

Wrought Iron

No. 6753—The ABC's of Wrought Iron is the title of a 20 page illustrated booklet which tells in nontechnical terms what wrought iron is, why it resists corrosion and withstands shock and vibration, how it is made, and how it is bent, welded, and threaded. Various services for which pipe and plates are used in numerous industries are also depicted. The manufacturer is A. M. Byers Co., Clark Bldg., Pittsburgh 22, Pa.

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Little Man with the right answer—
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A PORTABLE
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Anyone can make perfect bends with a Tal machine, on-the-job or in-the-shop. This fast working, easy-to-operate bender for wrought iron or steel pipe does in minutes work that otherwise takes many hours. No wonder thousands are in service everywhere. Write today for factual bulletin.
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Portable cabinets, in sizes from 200 to 1400 CFM automatically controlled, using calcium chloride for preventing condensation in unheated buildings during winter and in basement rooms during summer, for drying rooms and for drying processes, also for use in connection with radiant cooling systems.

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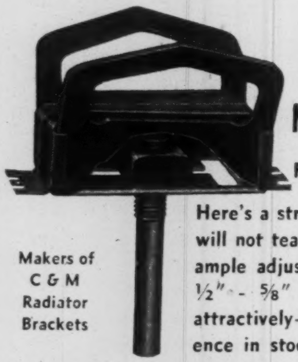

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of

HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT

for

INDUSTRIAL, COMMERCIAL, INSTITUTIONAL AND PUBLIC BUILDINGS

PART 1—PRODUCTS CLASSIFIED—PAGE 302

If you want to know the names of one or more manufacturers making a certain product, look in Part 1, where products are classified alphabetically in "directory style" with the noun governing (for instance, "unit heaters" are listed under "heaters, unit").

PART 2—TRADE NAMES—Page 387

If you have the trade name of a product and want to know who manufactures it, look in Part 2, where trade names are alphabetically listed. Trade names the same as or identifiable from the company name are not listed. Manufacturers with such trade names can be easily identified under their product classification in Part 1.

PART 3—MANUFACTURERS' ADDRESSES—PAGE 400

For the complete name and address of any manufacturer look in Part 3.

● The manufacturers whose names are spotted throughout the listings advertise in this issue. See Index to Advertisers (on page 416) for the page on which you will find the advertising of any of these manufacturers.

Heating, Piping & Air Conditioning
6 N. Michigan Ave.
Chicago 2, Illinois

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 1—PRODUCTS CLASSIFIED

ABSORBERS, VIBRATION

See Hose, Metal and Fittings; Bases and Pads, Vibration Isolating

ABSORBERS, VIBRATION FOR REFRIGERANT LINES

American Metal Hose Branch, The American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
Bendix Aviation Corp., Eclipse—Pioneer Div., Metal Hose Dept., Teterboro, N. J.
Chicago Metal Hose Corp., Maywood, Ill.
Firestone Industrial Products, Akron, O.
Packless Metal Products Corp., New Rochelle, N. Y.
Penflex Sales Co., Div. of Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Robinson Aviation, Inc., Vibrashock Div., Teterboro, N. J.
Seamlex Co., Inc., Long Island City, N. Y.
Titeflex, Inc., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.
Wade Mfg. Co., Elgin, Ill.

ABSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

ABSORPTION REFRIGERATION MACHINES

See Machines, Refrigeration, Absorption

ACCUMULATORS, REFRIGERATION (FOR AIR CONDITIONING)

● Acme Industries, Inc., Jackson, Mich.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
● Frick Co., Waynesboro, Pa.
● Henry Valve Co., Chicago, Ill.
● McQuay, Inc., Minneapolis, Minn.
Phillips & Co., H. A., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Temprite Products Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
XL Refrigerating Co., Chicago, Ill.

ADHESIVES, FOR PIPE COVERING

Arabol Mfg. Co., New York, N. Y.
Firestone Industrial Products, Akron, O.
Flintkote Co., The, New York, N. Y.
Miracle Adhesives Corp., New York, N. Y.
Moore Co., Goodloe E., Danville, Ill.
Pecora Paint Co., Inc., Philadelphia, Pa.
Sauereisen Cements Co., Pittsburgh, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.

ADJUSTABLE WRENCHES

See Wrenches, Adjustable

ADSORBERS, ODOR

Betz Corp., Hammond, Ind.
Carbide and Carbon Chemicals Corp., New York, N. Y.
● Connor Engineering Corp., W. B., New York, N. Y.
Refinite Corp., Omaha, Neb.
Tamms Silica Co., Chicago, Ill.

ADSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

AFTERCOOLERS, COMPRESSED AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
American Moistening Co., Providence, R. I.
Andale Co., Philadelphia, Pa.
● Bethlehem Steel Co., Bethlehem, Pa.
Blackburn-Smith Mfg. Co., River St., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Electric Sprayit Co., The, Sheboygan, Wis.
Goodyer Industries, Inc., Chicago, Ill.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, New York, N. Y.
Halstead & Mitchell, Pittsburgh, Pa.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
● Johnson Corp., The, Three Rivers, Mich.
● Joy Mfg. Co., Pittsburgh, Pa.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
Parks-Cramer Co., Fitchburg, Mass.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Ruemelin Mfg. Co., Milwaukee, Wis.
Schutte & Koerting Co., Philadelphia, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Wilson Engineering Corp., Chicago, Ill.
● Worthington Pump & Machinery Corp., Harrison, N. J.
● Young Radiator Co., Racine, Wis.

AIR AFTERCOOLERS

See Aftercoolers, Compressed Air

AIR BREAK FITTINGS

See Fittings, Drainage, Fixed Air Break

AIR CLEANERS

See Cleaners, Air, Electrical

AIR COMPRESSORS

See Compressors, Air

AIR CONDITIONERS

See Units, Air Conditioning

AIR CONDITIONING UNITS

See Units, Air Conditioning

AIR DIFFUSERS

See Diffusers, Air, High Velocity; Grilles; Panels, Perforated for Air Diffusion; Registers

AIR ELIMINATORS

See Eliminators, Air

AIR FILTER CLEANING COMPOUNDS

See Compounds, Cleaning, Air Filter

AIR FILTER GAGES

See Gages, Air Filter

AIR FILTERS

See Filters, Air

AIR FRESHENING

See Compounds, Air Freshening; Adsorbers, Odor

AIR OPERATING VALVES

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AIR PURIFICATION

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AIR RECOVERY EQUIPMENT

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AIR SEPARATORS

See Separators, Air

AIR VALVES

See Valves, Radiator, Air

AIR VELOCITY METERS

See Meters, Air Velocity, Direct Reading; Anemometers

AIR VOLUME METERS

See Meters, Volume, Air and Gas

AIR WASHERS

See Washers, Air

ALARMS, HIGH AND LOW BOILER WATER

American District Telegraph Co., New York, N. Y.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Combustion Control Corp., Cambridge, Mass.
Diamond Power Specialty Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer & Porter Co., Hatboro, Pa.
● Johnson Corp., The, Three Rivers, Mich.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Northern Equipment Co., Erie, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reliance Gauge Column Co., Cleveland, O.
Schade Valve Mfg. Co., Philadelphia, Pa.
● Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Wright-Austin Co., Detroit, Mich.
● Yarnall-Waring Co., Philadelphia, Pa.

ALARMS, SMOKE

American District Telegraph Co., New York, N. Y.
● Autempco Corp., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Ess Specialty Corp., Bergenfield, N. J.
Furst Electronics, Chicago, Ill.
General Power Plant Corp., New York, N. Y.
Instrument Engineering Associates, Brooklyn, N. Y.
Leeds & Northrup Co., Philadelphia, Pa.
Photoswitch, Inc., Cambridge, Mass.
Power Engineering Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Worner Electronic Devices, Rankin, Ill.

ALGAE CONTROL, WATER TREATMENT FOR SLIME AND

See Treatment, Water, for Slime and Algae Control

ALUMINUM COATED SHEETS

See Sheets, Aluminum Coated

ALUMINUM PIPE

See Pipe, Aluminum

ALUMINUM SHEETS

See Sheets, Aluminum

ANALYZERS, CARBON DIOXIDE, PORTABLE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Davis Emergency Equipment Co., Newark, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co. F., W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Engelhard, Inc., Chas., Newark, N. J.
● Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Service to Industry, West Hartford, Conn.
Uehling Instrument Co., Paterson, N. J.
Weaver Mfg. Co., Springfield, Ill.

ANEMOMETERS

Barclay, Inc., Robert, Chicago, Ill.
Dietzgen Co., Eugene, Chicago, Ill.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Hill, E. Vernon, Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.
Willson Products, Inc., Reading, Pa. (Thermometer type)

ANGLE VALVES

See Valves, Angle

ANGLES, BARS, BEAMS, CHANNELS AND TEES (LIGHT WEIGHT SHAPES)

Allegheny Ludlum Steel Corp., Pittsburgh, Pa. (Stainless)
● Aluminum Co. of America, Pittsburgh, Pa.
● American Brass Co., Waterbury, Conn.
Atlantic Steel Co., Atlanta, Ga.
B & M Mfg. Co, East Orange, N. J.
● Bethlehem Steel Co., Bethlehem, Pa.
Byers Co., A. M., Pittsburgh, Pa.
● Carnegie-Illinois Steel Corp., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
● Columbia Steel Co., United States Steel Corp., Subsidiary, San Francisco, Calif.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Decatur Iron & Steel Co., Decatur, Ala.
Dow Chemical Co., The, Midland, Mich.
Inland Steel Co., Chicago, Ill.
Inland Steel Products Co., Milwaukee, Wis.
International Steel Co., Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Lees, John, Div., The, Serrick Corp., Muncie, Ind.
Mesker Steel Corp., Geo. L., Evansville, Ind.
Republic Steel Corp., Cleveland, O.
● Revere Copper and Brass, Incorporated, New York, N. Y.
● Tennessee Coal, Iron & Railroad Co., United States Steel Corp. Subsidiary, Birmingham, Ala.
Truscon Steel Co., Youngstown, O.
● Weirton Steel Co., Weirton, W. Va.
● Youngstown Sheet & Tube Co., Youngstown, O.

AQUASTATS

See Thermostats

ARC WELDERS

See Welders, Arc

ARC WELDING ELECTRODES

See Electrodes, Arc Welding

ASBESTOS FIBER AND CEMENT PIPE

See Pipe, Asbestos Fiber and Cement

ASBESTOS PACKING

See Packing, Asbestos

ASH CONVEYORS

See Conveyors, Coal and Ash

ATOMIZING NOZZLES

See Nozzles, Atomizing

AXIAL FLOW FANS

See Fans, Axial Flow, Pressure Type

BALANCING ELBOWS FOR HOT WATER HEATING SYSTEMS

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BALANCING EQUIPMENT

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BALANCING VALVES

See Valves, Balancing

BALL BEARINGS

See Bearings, Ball

BAROMETRIC CONTROLS

See Controls, Draft, Barometric

BASEBOARD RADIATION

See Radiation, Baseboard

BASES, MOTOR, TENSION ADJUSTING

Ackermann Mfg. Co., Wheeling, W. Va.
Alexander Bros., Philadelphia, Pa.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.

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American Pulley Co., Philadelphia, Pa.
Browning Mfg. Co., Inc., Maysville, Ky.
Electrovent Fan & Mfg. Co., Chicago, Ill.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Maysteel Products, Inc., Milwaukee, Wis.
Remco Products Corp., York, Pa.
● Rhoads & Sons, J. E., Philadelphia, Pa.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
● Schnacke, Inc., Evansville, Ind.
Valley Foundry & Machine Works, Inc., Fresno, Calif.

BASES AND PADS, VIBRATION ISOLATING

● Buffalo Forge Co., Buffalo, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Cork Import Corp., Englewood, N. J.
Cork Insulation Co., Inc., New York, N. Y.
Felters Company, The, Boston, Mass.
Finn & Co., New York, N. Y.
Firestone Industrial Products, Akron, O.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hobsite Products Co., Paterson, N. J.
● Johns-Manville, New York, N. Y.
Korfund Co., Inc., Long Island City, N. Y.
● Lord Mfg. Co., Erie, Pa.
M B Mfg. Co., Inc., The, New Haven, Conn.
● Mundet Cork Corp., North Bergen, N. J.
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Raybestos-Manhattan, Inc., Passaic, N. J.
Remco Products Corp., York, Pa.
Robinson Aviation, Inc., Vibrashock Div., Teterboro, N. J.
Sponge Rubber Products Co., Shelton, Conn.
United Cork Companies, Lyndhurst, N. J.
United States Rubber Co., New York, N. Y.
Vibration Eliminator Co., Long Island City, N. Y.
Western Felt Works, Chicago, Ill.

BEARINGS, BALL

● Ahlberg Bearing Co., Chicago, Ill.
Bantam Bearings Div., The Torrington Co., South Bend, Ind.
Bearings Co. of America, Lancaster, Pa.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Jack & Heintz Precision Industries, Inc., Cleveland, O.
Landis & Gyr Inc., New York, N. Y.
Link-Belt Co., Indianapolis, Ind.
Marlin-Rockwell Corp., Jamestown, N. Y.
New Departure Div., General Motors Corp., Bristol, Conn.
Nice Ball Bearing Co., Philadelphia, Pa.
Norma-Hoffman Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Philadelphia, Pa.
Schatz Mfg. Co., The, Fairview, Poughkeepsie, N. Y.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Thomson Industries, Inc., Manhasset, N. Y.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, NEEDLE

Bantam Bearings Div., The Torrington Co., South Bend, Ind.
Roller Bearings Co. of America, Trenton, N. J.

BEARINGS, PILLOW BLOCK

● Ahlberg Bearing Co., Chicago, Ill.
Anti-Friction Bearings Co., Los Angeles, Calif.
Caldwell Co., W. E., Louisville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Dick Co., Inc., R. & J., Passaic, Ind.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Freed Products Co., Moline, Ill.
Goldens' Foundry & Machine Co., Columbus, Ga.
● Hastings Air Conditioning Co., Hastings, Neb.
Jeffrey Mfg. Co., Columbus, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Lau Blower Co., Dayton, O.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Moraine Products Div., General Motors Corp., Dayton, O.
Norma-Hoffman Bearings Corp., Stamford, Conn.
● Randall Graphite Bearings, Inc., Chicago, Ill.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing Corp., Chicago, Ill. (self aligning)
Sprout, Waldron & Co., Muncy, Pa.
Standard Pressed Steel Co., Jenkintown, Pa.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Triangle Mfg. Co., Oshkosh, Wis.
Viking Air Conditioning Corp., Cleveland, O.
Webb Co., The, Webb City, Mo.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, ROLLER

● Ahlberg Bearing Co., Chicago, Ill.
Bantam Bearings Div., The Torrington Co., South Bend, Ind.
Dodge Mfg. Corp., Mishawaka, Ind.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Roller Bearing Co. of America, Trenton, N. J.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing Corp., Chicago, Ill. (self aligning)
Timken Roller Bearing Co., Canton, O.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, SLEEVE

Cleveland Graphite Bronze Co., Cleveland, O.
Dodge Mfg. Corp., Mishawaka, Ind.
Federal-Mogul Corp., Detroit, Mich.
Green Fuel Economizer Co., Beacon, N. Y.
Johnson Bronze Co., New Castle, Pa.
Keystone Carbon Co., Inc., St. Marys, Pa.
Medart Co., St. Louis, Mo.
Moraine Products Div., General Motors Corp., Dayton, O.
● Randall Graphite Bearings, Inc., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BELLOWS, THERMOSTATIC AND METALLIC

● Bishop & Babcock Mfg. Co., Cleveland, O.
Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., Bridgeport, Conn.
Cashin Co., W. D. Boston, Mass.
Chicago Metal Hose Corp., Maywood, Ill.
Clifford Mfg. Co., Boston, Mass.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
MagniLastic Div., Cook Electric Co., Chicago, Ill.
● Sterling, Inc., Milwaukee, Wis.

BELTING, FLAT, LEATHER

Alexander Bros., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Chicago Belting Co., Chicago, Ill.
Graton & Knight Co., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
● Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
Williams & Son, I. B., Dover, N. H.

BELTING, FLAT, RUBBER

Boston Woven Hose & Rubber Co., Boston, Mass.
Dick Co., Inc., R & J Passaic, N. J.
Garlock Packing Co., Palmyra, N. Y.
Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Jeffrey Mfg. Co., Columbus, O.
Manheim Mfg. & Belting Co., Manheim, Pa.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.

BELTS, V

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
Dayton Rubber Co., Dayton, O.
Delavan Engineering Co., Des Moines, Ia.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., Denver, Colo.
Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.

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Jones Foundry & Machine Co., W. A., Chicago, Ill.
Manheim Mfg. & Belting Co., Manheim, Pa.
Medart Co., St. Louis, Mo.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
Schieren Co., Chas. A., New York, N. Y.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Wood's Sons Co., T. B., Chambersburg, Pa.
● Worthington Pump & Machinery Corp., Harris, N. J.

BENDERS, PIPE

● American Pipe Bending Machine Co., Inc., Poultney, Vt.
American Pipe Tool Co., Chicago, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
● Buffalo Forge Co., Buffalo, N. Y.
Crown Die & Tool Co., Chicago, Ill. (Hand)
Electric Cord Co., New York, N. Y.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
O'Neil Irwin Mfg. Co., Lake City, Minn.
● Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Radiant Devices, St. Louis, Mo.
Sac Tool Mfg. Co., St. Louis, Mo.
● Tal Bender, Inc., Milwaukee, Wis.
Vanderman Mfg. Co., Willimantic, Conn.
Wallace Supplies Mfg. Co., Chicago, Ill.
● Watson-Stillman Co., Roselle, N. J.

BENDERS, TUBING

● American Pipe Bending Machine Co., Inc., Poultney, Vt.
Armstrong Mfg. Co., Bridgeport, Conn.
Bernz Co., Inc., Otto, Rochester, N. Y.
● Buffalo Forge Co., Buffalo, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Everhot Products Co., Chicago, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Griffith Equipment Co., Inc., Los Angeles, Calif.
Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
Imperial Brass Mfg. Co., Chicago, Ill.
Keeney Mfg. Co., Newington, Conn.
Leonard Precision Products Co., Garden Grove, Calif.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Parker Appliance Co., The, Cleveland, O.
● Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Sac Tool Mfg. Co., St. Louis, Mo.
Steel City Electric Co., Pittsburgh, Pa.
Wallace Supplies Mfg. Co., Chicago, Ill.
● Watson-Stillman Co., Roselle, N. J.

BENDS, EXPANSION, STEAM PIPE

American Locomotive Co., Alco Products Div., New York, N. Y.
Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Flori Pipe Co., The, St. Louis, Mo.
● Grinnell Co., Inc., Providence, R. I.
Harris & Co., Arthur, Chicago, Ill. (Stainless & non-ferrous)
Kellogg Co., M. W., The, New York, N. Y. (Corrugated steel)
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
● Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw-Knox Co., Pittsburgh, Pa.
● Rempe Co., Chicago, Ill.
● Ric-wiL Co., Cleveland, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw-Kendall Engineering Co., Toledo, O.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
● Walworth Co., New York, N. Y.
Western Piping & Engineering Co., San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.

BI-METALS, THERMOSTATIC

Baker & Co., Inc., Newark, N. J.
Chase Co., W. M., Detroit, Mich.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wilson Co., H. A., The, Newark, N. J.

BLADES, PROPELLER FAN

Ackermann Mfg. Co., Wheeling, W. Va.
Aerovent Fan Co., Piqua, O.
Aire-Foile Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
● Alliance Mfg. Co., Alliance, O.
Burden Co., Los Angeles, Calif.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Circulators & Devices Mfg. Corp., New York, N. Y.
DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dual Air Fan Co., Chicago, Ill.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Gates Engineering Co., Wilmington, Del.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
International Engrg. Inc., Dayton, O.
Jeffrey Mfg. Co., Columbus, O.
● Joy Mfg. Co., Pittsburgh, Pa.
Martin Fan & Blower Co., Chicago, Ill.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Motionair Co., Los Angeles, Calif.
Meyers Electric Co., Inc., Pittsburgh, Pa.
Norwin Co., Freeport, Ill.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Peerless Electric Co., Warren, O.
Propellair, Inc., Springfield, O.
Schwitzer-Cummins Co., Indianapolis, Ind.
● South Bend Air Products, Inc., South Bend, Ind.
Standard Electric Mfg. Co., West Berlin, N. J.
Thermal Industries, Indio, Calif.
Torrington Mfg. Co., Torrington, Conn.
● Utility Appliance Corp., Los Angeles, Calif.
Victor Electric Products, Inc., Cincinnati, O.
Westinghouse Electric Corp., Pittsburgh, Pa.

BLAST GATES

See Gates, Blast

BLAST HEATERS

See Surface, Heating

BLAST HEATING COILS

See Surface, Heating

BLINDS, LINE, PIPE

Hamer Oil Tool Co., Long Beach, Cal.

BLOW PIPE FITTINGS

See Fittings, Blow Pipe

BLOWER FANS

See Fans, Axial Flow and Fans, Centrifugal

BLOWER HOUSINGS

See Housings, Fan

BLOWER WHEELS

See Housings, Fan

BLOWERS, HIGH PRESSURE

For Low Pressure Blower Fans, See Fans, Centrifugal

Aladdin Heating Corp., Oakland, Calif.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Blower Corp., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Beach-Russ Co., New York, N. Y.
● Buffalo Forge Co., Buffalo, N. Y.
Buffalo Turbine Corp., Buffalo, N. Y.
Carling Turbine Blower Co., Worcester, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
● Clarage Fan Co., Kalamazoo, Mich.
De Laval Steam Turbine Co., Trenton, N. J.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
General Blower Co., Morton Grove, Ill.
● Ingersoll-Rand Co., New York, N. Y.
● Joy Mfg. Co., Pittsburgh, Pa.
Lammert & Mann Co., Chicago, Ill.
Lamson Corp., Syracuse, N. Y.
Martin Fan & Blower Co., Chicago, Ill.

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National Machine Works, Chicago, Ill.
North American Mfg. Co., Cleveland, O.
Power Engineering Co., Chicago, Ill.
Prat-Daniel Corp, Port Chester, N. Y.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Roots-Connersville Blower Corp., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
Trimount Rotary Power Co., East Bedham, Mass.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle Wash.
● Westinghouse Electric Corp., Pittsburgh, Pa.
● Wing Mfg. Co., L. J., New York, N. Y.

BLOWERS, SOOT

Bayer Co., St. Louis, Mo.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Diamond Power Specialty Corp., Detroit, Mich.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Marion Machine Foundry & Supply Co., Marion, Ind.
Perfection Grate & Stoker Co., Springfield, Mass.

BLOW-OFF VALVES

See Valves, Blow-off

BLUE PRINT MACHINES

See Machines, Blue Print and White Print

BOILER CLEANING COMPOUNDS

See Compounds, Boiler Cleaning

BOILER FEED PUMPS

See Pumps, Boiler Feed

BOILER FEEDERS

See Feeders, Water, Heating Boiler

BOILER OBSERVATION PORTS

See Ports, Observation, Boiler

BOILER SEALING COMPOUNDS

See Compounds, Boiler and Radiator Sealing

BOILER AND TANK INSULATION

See Insulation, Boiler and Tank

BOILER TUBES

See Tubes, Boiler

BOILER WATER ALARMS

See Alarms, High and Low Boiler Water

BOILERS, HEATING, CAST IRON, SECTIONAL

2000 Sq Ft Steam Radiation and Over

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bastian-Morley Co., Inc., La Porte, Ind.
● Bryant Heater Co., Cleveland, O.
Bryant Steam Corp., Peru, Ind.
Burnham Corp., Boiler Div., Irvington, N. Y.
Columbia Radiator Co., McKeesport, Pa.
● Crane Co., Chicago, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Eastern Foundry Co., Peerless Heater Div., Boyertown, Pa.
Herbert Boiler Co., Chicago, Ill.
International Heater Co., Utica, N. Y.
Kohler Co., Kohler, Wis.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Radiator Co., The, Johnstown, Pa.
Prox Co., Inc., Frank, Terre Haute, Ind.
Richmond Radiator Co., New York, N. Y.
● Smith Co., Inc., H. B., The, Westfield, Mass.
● Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
● Surface Combustion Corp., Toledo, O.
● United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Michigan City, Ind.

BOILERS, HEATING, STEEL, FIRE TUBE

2000 Sq Ft Steam Radiation and Over

Aldrich Co., The, Wyoming, Ill.
Alert Engineering Products, Detroit, Mich.
Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Atlantic Steel Boiler Co., Philadelphia, Pa.
Bigelow Co., New Haven, Conn.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
● Brownell Co., Dayton, O.
Burnham Corp., Boiler Div., Irvington, N. Y.
Combustion Engineering Co., Inc., New York, N. Y.
Delta Shipbuilding Div., American Shipbuilding Co., Cleveland, O.
Dillon Steam Boiler Wks., Inc., D. M. Fitchburg, Mass.
Dutton Co., C. H., Kalamazoo, Mich.
Erie City Iron Wks., Erie, Pa.
Farrar & Trefts, Buffalo, N. Y.
● Fitzgibbons Boiler Co., Inc., New York, N. Y.
Frost Mfg. Co., Galesburg, Ill.
Gallaher Boiler Co., St. Louis, Mo.
Hamburg Boiler Works, Inc., Hamburg, Pa.
Hodge Boiler Wks, East Boston, Mass.
International Engineering Wks., Inc., Framingham, Mass.
Johnston Bros., Inc., Ferrysburg, Mich.
● Kewanee Boiler Corp., Kewanee, Ill.
Leffel & Co., James, Springfield, O.
Loline Steel Boiler Co., Allentown, Pa.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Manitowoc Boiler Wks., Manitowoc, Wis.
● Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Murray Iron Wks. Co., Burlington, Ia.
National Radiator Co., The, Johnstown, Pa.
Orr & Sembower, Inc., Reading, Pa.
● Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Smith Twin Tubular Boiler Co., Inc., Philadelphia, Pa.
● Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
Terre Haute Boiler Works Co., Terre Haute, Ind.
● Titusville Iron Wks. Co., The, Titusville, Pa.
Union Iron Wks., Erie, Pa.
Waterfilm Boilers, Inc., Jersey City, N. J.
Wickes Boiler Co., Saginaw, Mich.

BOILERS, HEATING, STEEL, WATER TUBE

Anetsberger Bros., Chicago, Ill.
Atlantic Steel Boiler Co., Philadelphia, Pa.
● Babcock & Wilcox Co., New York, N. Y.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Combustion Engineering Co., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crotty Mfg. Co., Flushing, L. I., N. Y.
Edge Moor Iron Wks., Inc., Edge Moor, Del.
Erie City Iron Wks., Erie, Pa.
International Boiler Wks. Co., East Stroudsburg, Pa.
International Engineering Wks., Inc., Framingham, Mass.
Keeler Co., E., Williamsport, Pa.
Murray Iron Wks., Co., Burlington, Ia.
Riley Stoker Corp., Worcester, Mass.
Springfield Boiler Co., Springfield, Ill.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Sullivan Valve & Engineering Co., Butte, Mont.
Super Mold Corp., Lodi, Calif.
● Titusville Iron Works Co., The, Titusville, Pa.
Union Iron Works, Erie, Pa.
Vapor Car Heating Co., Inc., Chicago, Ill.
Viking Mfg. Corp., Cleveland, O.
Waterfilm Boilers, Inc., Jersey City, N. J.
Wickes Boiler Co., Saginaw, Mich.
Will-Burt Co., The, Orrville, O.

BOILERS, PACKAGED STEAM GENERATING UNITS, HEATING AND PROCESS

Alert Engineering Products, Detroit, Mich.
Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Bigelow Co., New Haven, Conn.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brown Fintube Co., The, Elyria, O.
● Brownell Co., Dayton, O.
Bryan Steam Corp., Peru, Ind.
Clayton Mfg. Co., El Monte, Calif.
● Cleaver-Brooks Co., Milwaukee, Wis.
Cronholm Mfg. Co., Portland, Ore. (Electrical)
Cyclotherm Corp., New York, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Erie City Iron Works, Erie, Pa.
● Fitzgibbons Boiler Co., Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
General Furnaces Corp., Oswego, N. Y.
Hodge Boiler Works, East Boston, Mass.
Hynes Electric Heating Co., Camden, N. J.
International Boiler Works Co., East Stroudsburg, Pa.
International Engineering Works, Inc., Framingham, Mass.
Johnson Co., S. T., Philadelphia, Pa.
Johnston Bros., Inc., Ferrysburg, Mich.
Keeler Co., E., Williamsport, Pa.
Leffel & Co., James, Springfield, O.
Livingstone Engineering Co., Boston, Mass.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Kresno-Stamm Mfg. Co., (America), Inc., Palisades Park, N. J.
Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Orr & Sembower, Inc., Reading, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Sellers Engineering Co., Chicago, Ill.
Stout & Sons, David, St. Louis, Mo.
Superior Combustion Industries, Inc., Emmaus, Pa.

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Thermal Engineering Co., Chicago, Ill.
● Titusville Iron Works Co., The, Titusville, Pa.
Union Iron Works, Erie, Pa.
Vapor Car Heating Co., Inc., Chicago, Ill.
Vogt Machine Co., Henry, Louisville, Ky.
Western Piping & Engineering Co., San Francisco, Calif.
Wickes Boiler Co., Saginaw, Mich.
York-Shipley, Inc., Industrial Div., York, Pa.

BOLTS, EXPANSION

Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Industrial Screw Co., Chicago, Ill.
National Lead Co., New York, N. Y.
Paine Co., Chicago, Ill.
Rawlplug Co., Inc., The, New York, N. Y.
Rolyan Metal Products, Chicago, Ill.
Star Expansion Bolt Co., New York, N. Y.
U. S. Expansion Bolt Co., York, Pa.

BOLTS AND STUDS, FLANGE

● Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., North Tonawanda, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Clark Bros. Bolt Co., Milldale, Conn.
● Crane Co., Chicago, Ill.
Erie Bolt & Nut Co., Erie, Pa.
Harper Co., H. M., Chicago, Ill.
Haskell Mfg. Co., Wm. H., Pawtucket, R. I.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Pheoll Mfg. Co., Chicago, Ill.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Rockford Screw Products Co., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS, TOGGLE AND ANCHOR

Carpenter & Paterson, Inc., East Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Manasquan, N. J.
Grabler Mfg. Co., Cleveland, O.
Industrial Screw Co., Chicago, Ill.
Moore Co., Goodloe E., Danville, Ill.
Paine Co., Chicago, Ill.
Rawlplug Co., Inc., The, New York, N. Y.
Star Expansion Bolt Co., New York, N. Y.
U. S. Expansion Bolt Co., York, Pa.

BOOTHS, PAINTING, SPRAY

Binks Mfg. Co., Chicago, Ill.
Centri-Spray Corp., Detroit, Mich. (wet type)
Circulators & Devices Mfg. Corp., New York, N. Y.
DeVilbiss Co., The, Toledo, O.
Electric Sprayit Co., The, Sheboygan, Wis.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Kirk & Blum Mfg. Co., Cincinnati, O.
Mahon Co., R. C., Detroit, Mich.
Newcomb Engineering Co., Grand Rapids, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Schmieg Industries, Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
Young & Bertke Co., Cincinnati, O.

BRAKES, SHEET METAL, HAND

Dreis & Krump Mfg. Co., Chicago, Ill.
Elker Mfg. Co., Ogallala, Neb.
Excelsior Tool & Machine Co., East St. Louis, Ill.
New Albany Machine Mfg. Co., New Albany, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
St. Louis Tool Co., St. Louis, Mo.
Webb Machine & Tool Co., Imperial, Pa.
Weiss & Co., H., New York, N. Y.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, PORTABLE

Dreis & Krump Mfg. Co., Chicago, Ill.
Elker Mfg. Co., Ogallala, Neb.
Harris, A. R., Hammond, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Webb Machine & Tool Co., Imperial, Pa.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, POWER

Bath Co., Cyril, The, Cleveland, O.
Cincinnati Shaper Co., Cincinnati, O.
Dreis & Krump Mfg. Co., Chicago, Ill.
Heartley Machine & Tool Co., Toledo, O.
Niagara Machine & Tool Works, Buffalo, N. Y.
Ohl & Co., Geo. A., Newark, N. J.
Peck, Stow & Wilcox Co., Southington, Conn.
Rafter Machine Co., Inc., Belleville, N. J.
Verson Allsteel Press Co., Chicago, Ill.
Weiss & Co., H., New York, N. Y.
Whitney Metal Tool Co., Rockford, Ill.
Wilson Co., K. R., Buffalo, N. Y.

BRASS PIPE

See Pipe, Brass and Copper

BRASS TUBING

See Tubing, Brass and Copper

BRASS UNIONS

See Unions, Brass

BRASS VALVES

See Valves, Gate; and Valves, Globe

BRAZING TORCHES

See Torches, Brazing

BREAKERS, VACUUM (For Steam Using Equipment)

Bailey Co., Chas. M., San Francisco, Calif.
Schade Valve Mfg. Co., Philadelphia, Pa.

BRONZE VALVES

See Valves, Gate; and Valves, Globe

BUILDING INSULATION

See Insulation, Building

BURNERS, GAS, COMMERCIAL AND INDUSTRIAL

Barber Gas Burner Co., Cleveland, O.
Barton Co., Minneapolis, Minn.
Beck Engineering Combustion Kompany, St. Louis, Mo.
● Bryant Heater Co., Cleveland, O.
Campbell Heating Co., E. K., Kansas City, Mo.
Central States Mfg. Co., Inc., Arkansas City, Kan.
Coppus Engineering Corp., Worcester, Mass.
Dalzen Tool & Mfg. Co., Detroit, Mich.
Eclipse Fuel Engrg. Co., Rockford, Ill.
Engineer Co., New York, N.Y.
● Enterprise Engine & Foundry Co., San Francisco, Calif.
Finn Engineers, Jerry, St. Paul, Minn.
● Haney Gas Burner & Engineers, Monrovia, Calif.
Jamieson Mfg. Co., Dallas, Tex.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Martin Co., Inc., J. O., San Francisco, Calif.
● Mettler Co., Lee B., Los Angeles, Calif.
Mid-Continent Metal Products Co., Chicago, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Newcomb Engineering Co., Grand Rapids, Mich.
Norman Products Co., Inc., Columbus, O.
North American Mfg. Co., Cleveland, O.
Payne Furnace Co., Beverly Hills, Calif.
Peabody Engrg. Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
● Ray Oil Burner Co., San Francisco, Calif.
● Reinhard Brothers Co., Minneapolis, Minn.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Rotary Mfg. Co., Los Angeles, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Selas Corp. of America, Philadelphia, Pa.
Sellers Engineering Co., Chicago, Ill.
Sonner Burner Co., Winfield, Kan.
Staples & Pfeiffer, San Francisco, Calif.
Standard Fuel & Engineering Co., Detroit, Mich.
Stout & Sons, David, St. Louis, Mo.
Sullivan Valve & Engineering Co., Butte, Mont.
● Surface Combustion Corp., Toledo, O.
Todd Shipyards Corp., Combustion Equipment Div., New York, N. Y.
● Webster Engineering Co., Tulsa, Okla.
Williams, Inc., F. C., Dearborn, Mich.
● Zink Co., John, Tulsa, Okla.

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BURNERS, GAS AND OIL COMBINED, COMMERCIAL AND INDUSTRIAL

Auburn Burner Co., Auburn, Ind.
● Babcock & Wilcox Co., New York, N. Y.
Coppus Engineering Corp., Worcester, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
Engineer Co., New York, N. Y.
● Enterprise Engine & Foundry Co., San Francisco, Calif.
● Haney Gas Burner & Engineers, Monrovia, Calif.
Johnson Co., S. T., Philadelphia, Pa.
Lammert & Mann Co., Chicago, Ill.
● Mettler Co., Lee B., Los Angeles, Calif.
National Airoil Burner Co., Inc., Philadelphia, Pa.
North American Mfg. Co., Cleveland, O.
Peabody Engineering Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
● Ray Oil Burner Co., San Francisco, Calif.
Sellers Engineering Co., Chicago, Ill.
Staples & Pfeiffer, San Francisco, Calif.
Superior Combustion Industries, Inc., Emmaus, Pa.
● Surface Combustion Corp., Toledo, O.
Thermal Engineering Co., Chicago, Ill.
Todd Shipyards Corp., Combustion Equipment Div., New York, N. Y.
● Webster Engineering Co., Tulsa, Okla.
● Zink Co., John, Tulsa, Okla.

BURNERS, OIL, COMMERCIAL AND INDUSTRIAL

Ace Engineering Co., Chicago, Ill. (Rotary)
Airtemp, Div. of Chrysler Corp., Dayton, O.
Aldrich Co., The, Wyoming, Ill.
American Heat Corp., Boston, Mass. (Steam atomizing)
● Babcock & Wilcox Co., New York, N. Y.
Bethlehem Foundry & Machine Co., Bethlehem, Pa.
Caloroil Burner Corp., Hartford, Conn.
Catskill Metal Works, Inc., Catskill, N. Y.
Central States Mfg. Co., Inc., Arkansas City, Kan.
Century Engrg. Corp., Cedar Rapids, Ia.
Chandler Co., Cedar Rapids, Ia.
Chisholm Co., Allen E., Portland, Ore.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Crotty Mfg. Co., Flushing, L. I., N. Y.
Dalmo-Victor Co., San Carlos, Calif.
Eastern Oil & Equipment Co., Inc., Portland, Me.
Eckhart Mfg. Co., Roselle, N. J. (High pressure atomizing)
Electrol Burner Mfg. Co., Inc., Rutherford, N. J.
Engineering Co., New York, N. Y.
● Enterprise Engine & Foundry Co., San Francisco, Calif.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Hardinge Mfg. & Oil Burner Co., Chicago, Ill.
Harvey-Whipple, Inc., Springfield, Mass.
Holtum Mfg. Co., Freeport, Ill.
Iron Fireman Mfg. Co., Cleveland, O. (Rotary atomizing, high pressure atomizing)
● Jackson & Church Co., Saginaw, Mich.
Johnson Co., S. T., Philadelphia, Pa.
Kleen-Heet, Inc., Chicago, Ill.
Lammert & Mann Co., Chicago, Ill.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Littleford Bros., Cincinnati, O.
Malleable Iron Fittings Co., Branford, Conn. (High pressure atomizing)
● Mettler Co., Lee B., Los Angeles, Calif.
Montag Stove & Furnace Works, Portland, Ore.
● Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Oil Burner Co. of N. Y. Inc., Brooklyn, N. Y. (Horizontal rotary)
North American Mfg. Co., Cleveland, O.
Nu-Way Corp., The, Rock Island, Ill.
Pan-American Engineering Co., Berkeley, Calif.
Peabody Engrg. Corp., New York, N. Y.
● Petroleum Heat & Power Co., Stamford, Conn.
Preferred Utilities Mfg. Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
● Ray Oil Burner Co., San Francisco, Calif. (High pressure atomizing rotary)
Rayfield Co., C. L., Chicago, Ill. (Low pressure atomizing)
Reif-Rexoil, Inc., Buffalo, N. Y.
Riley Stoker Corp., Worcester, Mass.
Richfield Mfg. Corp., New York, N. Y.
Rotary Mfg. Co., Los Angeles, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Simplex Oil Heating Corp., New York, N. Y.
Staples & Pfeiffer, San Francisco, Calif.
Superior Combustion Industries, Inc., Emmaus, Pa.
Thermal Engineering Co., Chicago, Ill.
Todd Shipyards Corp., Combustion Equipment Div., New York, N. Y. (Variable capacity, rotary, pressure atomizing steam atomizing)
U. S. Machine Corp., Lebanon, Ind.
Vapofier Corp., Chicago, Ill. Pre-mixed gaseous fuel generator)
● Webster Engineering Co., Tulsa, Okla.
Will-Burt Co., The, Orrville, O. (High pressure)
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
York Electric & Machine Co., York, Pa. (High pressure atomizing)
York-Heat Div., York-Shipley, Inc., York, Pa.
York-Shipley, Inc., Industrial Div., York, Pa. (Rotary)
● Zink Co., John, Tulsa, Okla.

BURNERS, PULVERIZED COAL, COMMERCIAL AND INDUSTRIAL

● Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering Co., Inc., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Whiting Corp., Harvey, Ill.

BURNERS, PULVERIZED COAL AND GAS, COMBINED, COMMERCIAL AND INDUSTRIAL

● Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering Co., Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

BURNERS, PULVERIZED COAL AND OIL, COMBINED, COMMERCIAL AND INDUSTRIAL

● Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering Co., Inc., New York, N. Y.
Engineer Co., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

CAPS, VENT FLUE

Accurate Sheet Metal Mfg. Works, Chicago, Ill.
Breidert Co., G. C., Los Angeles, Calif.
Gelert Co., C. R., Pasadena, Calif.
King Gauge & Mfg. Co., New Haven, Conn.
Petroleum Equipment Mfg. Co., New Haven, Conn.
Preferred Utilities Mfg. Corp., New York, N. Y.

CARBON DIOXIDE ANALYZERS

See Analyzers, Carbon Dioxide, Portable

CARBON DIOXIDE INDICATORS

See Indicators, Carbon Dioxide, Boiler Room

CARBON PIPE, TUBING, FITTINGS AND VALVES

See Pipe, Tubing, Fittings and Valves, Carbon and Graphite

CAST IRON PIPE

See Pipe, Cast Iron

CEMENT AND COMPOUNDS, PIPE JOINT

Acme Refining Co., The, Cleveland, O.
Acorn Refining Co., Cleveland, O.
Akron Metallic Gasket Co., Akron, O.
Arco Co., Cleveland, O.
Atlas Chemical Co., Marietta, O.
Babbitt Chemical Specialties Co., New York, N. Y.
Baer Bros., New York, N. Y.
Black Magic Products Co., Tulsa, Okla.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., Roselle Park, N. J.
Bowser, Inc., Fort Wayne, Ind.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chicago Specialty Mfg. Co., Chicago, Ill.
Colebrook & Sons, Inc., W. H. Syracuse, N. Y.
Continental Products Co., Euclid, O.
Cooper Sanitary Co., Philadelphia, Pa.
● Crane Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Croll & Son, Jesse G., Philadelphia, Pa.
Diamond Chemical Products, New York, N. Y.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Felt Products Mfg. Co., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
● Grinnell Co., Inc., Providence, R. I.
Hercules Chemical Co., Inc., New York, N. Y.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
● Key Co., East St. Louis, Ill.
Keystone Asphalt Products Co., Chicago, Ill.
Krehbiel Co., J. H., Chicago, Ill.
Lake Chemical Co., Chicago, Ill.
Macksons Co., New York, N. Y.
Metropolitan Refining Co., Long Island City, N. Y.

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Milwaukee Gas Specialty Co., Milwaukee, Wis.
Montgomery Bros., San Francisco, Calif.
National Engineering Products, Inc., Washington, D. C.
Nebel Mfg. Co., Cleveland, O.
Pecora Paint Co., Inc., Philadelphia, Pa.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Permatex Co., Inc., Brooklyn, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Rutland Fire Clay Co., Rutland, Vt.
Sauereisen Cements Co., Pittsburgh, Pa.
Saverite Engineering Co., Hoboken, N. J.
Schundler & Co., F. E., Long Island City, N. Y.
Smooth-On Mfg. Co., Jersey City, N. J.
Star Products Co., New York, N. Y.
Sulflo, Inc., Elizabeth, N. J.
United States Stoneware Co., New York, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Wilhelm Co., A., Reading, Pa.
X Laboratories, Inc., New York, N. Y.
X-Pando Corp., Long Island City, N. Y.

CEMENT, FURNACE

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Armstrong Co., Detroit, Mich.
● Babcock & Wilcox Co., New York, N. Y.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Chicago Fire Brick Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Clinton Metallic Paint Co., Clinton, N. Y. (Asbestos)
Colebrook & Sons, Inc., W. H. Syracuse, N. Y.
Continental Products Co., Euclid, O.
Diamond Chemical Products, New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fireline Stove & Furnace Lining Co., Chicago, Ill.
● Grant Wilson, Inc., Chicago, Ill. (Asbestos)
Green Fire Brick Co., A. P., Mexico, Mo.
Hercules Chemical Co., Inc., New York, N. Y.
● Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y. (Asbestos)
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Lastik Products Co., Inc., Pittsburgh, Pa.
McLeod & Henry Co., Inc., Troy, N. Y.
Munn and Steel, Inc., Newark, N. J.
Nebel Mfg. Co., Cleveland, O.
Pecora Paint Co., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Preferred Utilities Mfg. Corp., New York, N. Y.
Presstite Engineering Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Ruberoid Co., New York, N. Y.
Rutland Fire Clay Co., Rutland, Vt.
Sall Mountain Co., Chicago, Ill.
Sauereisen Cements Co., Pittsburgh, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Tamms Silica Co., Chicago, Ill.
Taylor Sons Co., Charles, Cincinnati, O.
United States Register Co., Battle Creek, Mich.
United States Stoneware Co., New York, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Walsh Refractories Corp., St. Louis, Mo.
Wilhelm Co., A., Reading, Pa.
● Wilson, Inc., Grant, Chicago, Ill. (Asbestos)

CEMENT, INSULATING

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alton Mineral Wool Insulation Co., St. Louis, Mo.
Armstrong Cork Co., Lancaster, Pa.
● Babcock & Wilcox Co., New York, N. Y.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Carney Co., Inc., The, Mankato, Minn.
Chicago Fire Brick Co., Chicago, Ill.
Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Diamond Chemical Products, New York, N. Y.
Eagle-Picher Lead Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
● Grant Wilson, Inc., Chicago, Ill.
Green Fire Brick Co., A. P., Mexico, Mo.
Industrial Research, Lansdowne, Pa.
International Vermiculite Co., Girard, Ill.
● Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa. (85 per cent magnesia)
Krehbiel Co., J. H., Chicago, Ill. (Asbestos, mineral wool)
Laclede-Christy Clay Products Co., St. Louis, Mo.
McLeod & Henry Co., Inc., Troy, N. Y.
Moore Co., Goodloe E., Danville, Ill.
Munn and Steele, Inc., Newark, N. J.
National Engineering Products, Inc., Washington, D. C.
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Ohmlac Paint & Refining Co., New York, N. Y.
● Owens-Corning Fiberglas Corp., Toledo, O.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Peterson Co., B. A., Dowagiac, Mich.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Poe Co., C. W., Cleveland, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
Robinson Insulation Co., Great Falls, Mont.
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y.
Rutland Fire Clay Co., Rutland, Vt.
Sall Mountain Co., Chicago, Ill.
Sauereisen Cements Co., Pittsburgh, Pa. (Electrical)
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Tennessee Products and Chemical Corp., Nashville, Tenn.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Mineral Wool Co., South Milwaukee, Wis.
Universal Zonolite Insulations Co., Chicago, Ill.
● Wilson, Inc., Grant, Chicago, Ill.

CENTRIFUGAL PUMPS

See Pumps, Centrifugal

CHAIN DRIVES

See Drives, Chain

CHAMBERS, COMBUSTION, PREFORMED

Amerform Corp., Philadelphia, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Chicago Fire Brick Co., Chicago, Ill.
Green Fire Brick Co., A. P., Mexico, Mo.
Harvey, Inc., Sid, Valley Stream, N. Y.
McLeod & Henry Co., Inc., Troy, N. Y.
Monogram Combustion Chamber Co., Philadelphia, Pa.
Munn and Steel, Inc., Newark, N. J., (light fired refractory)
Peterson Co., B. A., Dowagiac, Mich.
Petroleum Equipment Mfg. Co., New Haven, Conn.
Preferred Utilities Mfg. Corp., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
Robinson Insulation Co., Great Falls, Mont.
Stuart Co., W. W., Des Moines, Ia.
Universal Zonolite Insulation Co., Chicago, Ill. (vermiculite concrete)
Walsh Refractories Corp., St. Louis, Mo.

CHAMBERS, TEST, CONTROLLED TEMPERATURE AND HUMIDITY

American Instrument Co., Silver Spring, Md.
Tenney Engineering, Inc., Newark, N. J.
● York Corp., York, Pa.

CHANGERS, SPEED, HYDRAULIC COUPLING

American Blower Corp., Detroit, Mich.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Link-Belt Co., Philadelphia, Pa.
Sundstrand Machine Tool Co., Hydraulic Div., Rockford, Ill.

CHANGERS, SPEED, MAGNETIC

Electric Machinery Mfg. Co., Minneapolis, Minn.
Reliance Electric & Engineering Co., Cleveland, O.

CHANGERS, SPEED, MECHANICAL

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Browning Mfg. Co., Inc., Maysville, Ky.

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Doall Co., The, Des Plaines, Ill.
Graham Transmissions, Inc., Milwaukee, Wis.
Lewellen Mfg. Co., Columbus, Ind.
Link-Belt Co., Philadelphia, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Reeves Pulley Co., Columbus, Ind.
Salsbury Motors, Inc., Pomona, Calif.
Standard Transmission Equipment Co., Los Angeles, Calif.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Webster Electric Co., Racine, Wis.
White Mfg. Co., St. Paul, Minn.
● Worthington Pump & Machinery Corp., Harrison, N. J.

CHECK VALVES

See Valves, Check

CHILLERS, WATER, FOR AIR CONDITIONING AND REFRIGERATION

● Acme Industries, Inc., Jackson, Mich.
Baker Ice Machine Co., Inc., South Windham, Me.
Condenser Service & Engineering Co., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Filtrine Mfg. Co., Brooklyn, N. Y.
● Frick Co., Waynesboro, Pa.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, New York, N. Y.
Halstead & Mitchell, Pittsburgh, Pa.
Heat Transfer Products, Inc., Carbondale, Pa.
Howe Ice Machine Co., Chicago, Ill.
Larkin Coils, Atlanta, Ga.
● McQuay, Inc., Minneapolis, Minn.
Niagara Blower Co., New York, N. Y.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering Corp., Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Temprite Products Corp., Detroit, Mich.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whitlock Mfg. Co., Hartford, Conn.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

CIRCULATORS FOR HOT WATER HEATING SYSTEMS

American-Marsh Pumps, Inc., Battle Creek, Mich.
● Bell & Gossett Co., Morton Grove, Ill.
Catskill Metal Works, Inc., Catskill, N. Y.
Columbus Steam Pump Works Co., Columbus, O.
Davidson Co., M. T., Brooklyn, N. Y.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Hotstream Heater Co., Cleveland, O.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Ruthman Machinery Co., Cincinnati, O.
Standard Electric Mfg. Co., West Berlin, N. J.
● Taco Heaters, Inc., New York, N. Y.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
● Weil Pump Co., Chicago, Ill.
White Flomatic Corp., Hoosick Falls, N. Y.

CLAMPS, BEAM, PIPE HANGING

Acme Mfg. Co., Philadelphia, Pa.
Carpenter & Paterson, Inc., East Boston, Mass.
Chicago Nipple Mfg. Co., Cicero, Ill.
Crawford Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
● Frick Co., Waynesboro, Pa.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Jarecki Mfg. Co., Erie, Pa.
Moore Co., Goodloe E., Danville, Ill.
National Valve & Mfg. Co., Pittsburgh, Pa.
Rockwood Sprinkler Co., Worcester, Mass.
● Walworth Co., New York, N. Y.

CLAMPS, HOSE

Everhot Products Co., Chicago, Ill.
Marman Products Co., Inc., Inglewood, Calif.
Tinnerman Products, Inc., Cleveland, O.

CLAMPS, PIPE REPAIR

Alten's Foundry & Machine Works, Lancaster, O.
Chelsea Metal Stamping Co., New York, N. Y.
Chicago Specialty Mfg. Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Jarecki Mfg. Co., Erie, Pa.
Marman Products Co., Inc., Inglewood, Calif.
Skinner Co., M. B., South Bend, Ind.
Smooth-On Mfg. Co., Jersey City, N. J.
● Yarnall-Waring Co., Philadelphia, Pa.

CLAMPS, PIPE, WELDING

Detroit Stamping Co., Detroit, Mich.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Jewel Mfg. Co., St. Paul, Minn.
● Williams & Co., J. H., Buffalo, N. Y.

CLEANERS, AIR, ELECTRICAL

● American Air Filter Co., Inc., Louisville, Ky.
Bartlett Hayward, Div. of Koppers Co., Baltimore, Md.
Drico Industrial Corp., New York, N. Y.
● Raytheon Mfg. Co., Commercial Products Div., Waltham, Mass.
Thermix Corp., The, Greenwich, Conn.
Trion, Inc., McKees Rocks, Pa.
Westinghouse Electric Corp., Pittsburgh, Pa.

CLEANERS, TUBE

Albright Equipment Co., Johnstown, Pa.
Armstrong Mfg. Co., Bridgeport, Conn.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Condenser Service & Engineering Co., Hoboken, N. J.
Elliott Co., Jeannette, Pa.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Osborn Mfg. Co., Cleveland, O.
Perfection Grate & Stoker Co., Springfield, Mass.
Pierce Co., Wm. B., The, Buffalo, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Spencer Turbine Co., Hartford, Conn.
● York Corp., York, Pa.

CLEANERS, VACUUM, FOR BOILERS

Ideal Industries, Inc., Sycamore, Ill.
Spencer Turbine Co., Hartford, Conn.
Whittington Pump & Engineering Co., Indianapolis, Ind.

CLEANING COMPOUNDS

See Compounds, Cleaning, Pipe Coil and Condenser

CLEANING COMPOUNDS, AIR FILTER

See Compounds, Cleaning, Air Filter

CLEANING MACHINES, PIPE

See Machines, Pipe Cleaning

COAL BURNERS

See Burners, Pulverized Coal; Stokers

COAL CONVEYORS

See Conveyors, Coal and Ash

COATINGS, PROTECTIVE, FOR METALS

Aeroil Products Co., West New York, N. J.
Alrose Chemical Co., Providence, R. I.

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Amercoat Div., American Pipe & Construction Co., Los Angeles, Calif.
American Solder & Flux Co., Philadelphia, Pa. (Galvanizing powder)
● Apex Engineering Co., Chicago, Ill. (Water cured protective tank lining for field application only)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y. (Pitchbase)
Bart Mfg. Co., Belleville, N. J.
Blue Ridge Talc Co., Inc., Henry, Va.
Bonafide Genasco, Inc., New York, N. Y.
Brooklyn Varnish Mfg. Co., Brooklyn, N. Y.
Cabot Inc., Samuel, Boston, Mass. (Bituminous black paint)
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J. (Metal spray)
Cordo Chemical Co., Norwalk, Conn.
Dampney Co. of America, Boston, Mass.
Dearborn Chemical Co., Chicago, Ill. (Rust preventive)
Debevoise Co., The, Brooklyn, N. Y.
Dow Corning Corp., Midland, Mich.
du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.
Flintkote Co., The, New York, N. Y. (Asphalt emulsions)
Galv-Weld Products, Dayton, O. (Regalvanizing)
Gates Engineering Co., Wilmington, Del.
Goodrich Co., B. F., Akron, O.
Haering & Co., Inc., D. W., Chicago, Ill. (Drying and non-drying)
Hardy, Inc., Charles, New York, N. Y. (18-8 stainless steel paste)
Houghton & Co., E. F., Philadelphia, Pa.
Industrial Metal Protectives, Inc., Dayton, O.
Interchemical Corp., Finishes Div., Newark, N. J.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Kellogg Co., M. W., The, New York, N. Y. (Heat resisting)
Knight, Maurice A., Akron, O. (Vinyl plastic base)
Koppers Co., Inc., Tar Products Div., Pittsburgh, Pa. (Coal tar)
Laclede-Christy Clay Products Co., St. Louis, Mo. (High temperature paint)
Lastik Products Co., Inc., Pittsburgh, Pa.
Lithgow Corp., Chicago, Ill.
Midland Paint & Varnish Co., Cleveland, O.
Miracle Adhesives, Corp., New York, N. Y.
Mortell Co., J. W., Kankakee, Ill. (Asphalt)
National Lead Co., New York, N. Y. (Red lead)
National Lining Co., Chicago, Ill. (Water cured protective tank lining for field application only)
Nebel Mfg. Co., Cleveland, O.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Nooter Boiler Works Co., John, St. Louis, Mo. (Metal spray, lead burning alloy sheet)
Ohmlac Paint & Refining Co., New York, N. Y. (Acid resistant, heat resistant)
Penn Galvanizing Co., Philadelphia, Pa. (Galvanizing)
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Perolin Co., Inc., Chicago, Ill.
Pittsburgh Plate Glass Co., Pittsburgh, Pa. (Paint, varnish, lacquer)
Preferred Utilities Mfg. Co., New York, N. Y.
Protective Coatings, Inc., Detroit, Mich.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind. (Coal tar base)
Rheem Mfg. Co., New York, N. Y.
● Ric-wiL Co., Cleveland, O.
Robertson Co., H. H., Pittsburgh, Pa.
Ruberoid Co., New York, N. Y.
Saverite Enginering Co., Hoboken, N. J. (Tank coatings, rust preventive)
Sonneborn Sons, Inc., L., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga. (Metallic paint)
Special Chemicals Corp., New York, N. Y. (Aluminum paint)
Tropical Paint & Oil Co., Cleveland, O.
Turco Products, Inc., Los Angeles, Calif.
United Chromium, Inc., New York, N. Y. (Chemical resisting organic coating)
United States Stoneware Co., New York, N. Y. (Corrosion resistant)
Vesco Corp., New York, N. Y.
Watson-Standard Co., Pittsburgh, Pa.
Wilbur & Williams Co., Boston, Mass.
Wolfe-Kote Co., Inc., Sheboygan, Wis.
X-Pando Corp., Long Island City, N. Y. (Anti-corrosive)

COCKS, BOILER GAGE

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bordo Co., Inc., L. J., Glenside, Pa.
● Crane Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Klingerit, Inc., New York, N. Y.
Lonergan Co., J. E., Philadelphia, Pa.
● Lunkenheimer Co., Cincinnati, O.
Marsh Corp., Jas. P., Skokie, Ill.
Reliance Gauge Column Co., Cleveland, O.
Swift Lubricator Co., Elmira, N. Y.
Williams Gauge Co., The, Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich.

COILS

See Surface, Cooling; Surface, Heating

COILS, CONDENSATION

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Lewis & Co., Joseph E., Baltimore, Md.
Parker Appliance Co., The, Cleveland, O.

COILS, FOR HOT WATER STORAGE TANKS

Adams Co., The, Dubuque, Ia.
American Cooling Tower Co., Kansas City, Mo.
● American District Steam Co., North Tonawanda, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Everhot Products Co., Chicago, Ill.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
Kold-Hold Mfg. Co., Lansing, Mich.
National Pipe Bending Co., New Haven, Conn.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
● Taco Heaters, Inc., New York, N. Y.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.

COILS AND PANELS, RADIANT HEATING, PREFABRICATED

Atlantic Pipebending & Fabricating Corp., Edgewater, N. J.
Cannelton Sewer Pipe Co., RadianTile Div., Chicago, Ill. (Vitrified clay floor blocks and ducts for warm air)
Clow & Sons, James B., Chicago, Ill.
Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Pan-L-Heat Corp., Portland, Ore.

COILS, PIPE

● Acme Industries, Inc., Jackson, Mich.
American Cooling Towers Co., Kansas City, Mo.
B & M Mfg. Co., East Orange, N. J.
Baker Ice Machine Co., Inc., South Windham, Me.
Ball Welding Works, Inc., Oakland, Calif.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Crane Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Harris & Co., Arthur, Chicago, Ill.
Kold-Hold Mfg. Co., Lansing, Mich.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Lewis & Co., Joseph E., Baltimore, Md.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
National Pipe Bending Co., New Haven, Conn.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
● Rempe Co., Chicago, Ill.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Semet-Solvay Engineering Corp., New York, N. Y.
Shaw-Kendall Engineering Co., Toledo, O.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Whitlock Mfg. Co., Hartford, Conn.

COLLECTORS, DUST

Aerotec Corp., The, Greenwich, Conn.
Aget-Detroit Co., Ann Arbor, Mich.
Allington & Curtis Mfg. Co., Saginaw, Mich.
● American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Metal Products Co., Fort Worth, Tex.
American Wheelabrator & Equipment Corp., Mishawaka, Ind.

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Bargar Sheet Metal Co., Cleveland, O.
Bayley Blower Co., Milwaukee, Wis.
Blower Application Co., Milwaukee, Wis.
Bubar, Hudson H., Old Lyme, Conn.
● Buffalo Forge Co., Buffalo, N. Y.
Buffalo Tank Corp., Dunellen, N. J.
Centri-Spray Corp., Detroit, Mich. (Wet type)
Clark Dust Control Co., Chicago, Ill.
Columbian Steel Tank Co., Kansas City, Mo.
Day Co., The, Minneapolis, Minn.
Diamond Power Specialty Corp., Detroit, Mich.
Dust Filter Co., Chicago, Ill.
Dust Suppression & Engineering Co., Lake Orion, Mich.
Goethel Sheet Metal Wks., Alfred, Milwaukee, Wis.
Ideal Industries, Inc., Sycamore, Ill.
Indiana Fan Company, Indianapolis, Ind.
Jacobs Co., B. & J., Cincinnati, O.
Kirk & Blum Mfg. Co., Cincinnati, O.
Kluegel & Co., E., St. Paul, Minn.
Knickerbocker Co., Jackson, Mich.
Lamson Corp., Syracuse, N. Y.
Lumm Co., A. H., Toledo, O.
Newcomb Engineering Co., Grand Rapids, Mich.
Nooter Boiler Works Co., John, St. Louis, Mo.
Northern Blower Co., Cleveland, O.
Pangborn Corp., Hagerstown, Md.
Peters-Dalton, Inc., Detroit, Mich.
Prat-Daniel Corp., Port Chester, N. Y.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Research Corp., New York, N. Y.
Ruemelin Mfg. Co., Milwaukee, Wis.
Schmieg Industries, Detroit, Mich.
Schneible Co., Claude B., Detroit, Mich.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Sly Mfg. Co., W. W., Cleveland, O.
Spencer Turbine Co., Hartford, Conn.
Steinhorst & Sons, Inc., Emil, Utica, N. Y.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Thermix Corp., The, Greenwich, Conn.
Torit Mfg. Co., St. Paul, Minn.
Wagner Awning & Mfg. Co., Cleveland, O. (Dust recovery bags)
Western Blower Co., Seattle, Wash.
Western Precipitation Corp., Los Angeles, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whiting Corp., Harvey, Ill.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
Young & Bertke Co., Cincinnati, O.

COLORIMETERS

Ellison Draft Gage Co., Chicago, Ill.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Photovolt Corp., New York, N. Y.
Will Corp., Rochester, N. Y.

COMBUSTION CHAMBERS

See Chambers, Combustion, Preformed

COMBUSTION CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion; Systems, Combustion Control

COMBUSTION RECORDERS

See Recorders, Carbon Dioxide

COMPOUNDS, AIR FRESHENING

Airkem, Inc., New York, N. Y.
Ampion Corp., Long Island City, N. Y.

COMPOUNDS, BOILER CLEANING

Acme Refining Co., The, Cleveland, O.
Agnew & Tomlinson, Long Island City, N. Y.
American K. A. T. Corp., New York, N. Y.
Anderson Stolz Corp., Kansas City, Mo.
● Apex Engineering Co., Chicago, Ill.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Bird-Archer Co., Philadelphia, Pa.
Blue Seal Chemical Co., Roselle Park, N. J.
Brown-Ford Corp., Newton, Mass.
Cannon Chemical Co., Inc., Everett, Mass.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Diamond Chemical Products, New York, N. Y.
Dowell Inc., Tulsa, Okla.
Ferro-Nil Corp., New York, N. Y.
Grief, Edward C., Bogota, N. J.
Haering & Co., Inc., D. W., Chicago, Ill.
● Hagan Corp., Pittsburgh, Pa.
Hercules Chemical Co., Inc., New York, N. Y.
Hood Refining Co., Greensburg, Pa.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Krehbiel Co., J. H., Chicago, Ill.
MacDermid Chemical Co., Bristol, Conn.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
North American Fibre Products Co., The, Cleveland, O.
O'Brien Industries, Jersey City, N. J.
Permutit Co., New York, N. Y.
Perolin Co., Inc., Chicago, Ill.
Radiator Specialty Co., Charlotte, N. C.
Ridgefield Chemical Products Co., Inc., Ridgefield, N. J.
Saverite Engineering Co., Hoboken, N. J.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn, N. Y.
Vinco Co., Inc., The, New York, N. Y.
Water Service Laboratories, Inc., New York, N. Y.
Western Chemical Co., Kansas City, Mo.
X Laboratories, Inc., New York, N. Y.

COMPOUNDS, BOILER AND RADIATOR SEALING

Ampion Corp., Long Island City, N. Y.
Atlas Chemical Co., Marietta, O.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Everett, Mass.
Chicago Specialty Mfg. Co., Chicago, Ill.
Cooper Sanitary Co., Philadelphia, Pa.
Dearborn Chemical Co., Chicago, Ill.
Desolvo Co., The, Pittsburgh, Pa.
Diamond Chemical Products, New York, N. Y.
Halowax Products Div., Union Carbide & Carbon Corp., New York, N. Y.
Hampton-Cross Co., The, Louisville, Ky.
Hercules Chemical Co., Inc., New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Engineering Products, Inc., Washington, D. C.
Penetone Co., The, Tenafly, N. J.
Permatex Co., Inc., Brooklyn, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Star Products Co., New York, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Utility Laboratories, Inc., Brooklyn, N. Y.
Vinco Co., Inc., The, New York, N. Y.
X Laboratories, Inc., New York, N. Y.

COMPOUNDS, CAULKING

Accurate Metal Weather Strip Co., New York, N. Y.
Acme Refining Co., The, Cleveland, O.
Acme White Lead & Color Works, Detroit, Mich.
Acorn Refining Co., Cleveland, O.
All Metal Weatherstrip Co., Chicago, Ill.
American-Marietta Co., Chicago, Ill.
American Metal Weather Strip Co., Grand Rapids, Mich.
Arco Co., Cleveland, O.
Armstrong Co., The, Detroit, Mich.
Asphalt Products Co., Syracuse, N. Y.
Babbitt Chemical Specialties Co., New York, N. Y.
Baldwin-Hill Co., Trenton, N. J.
Blue Ridge Talc Co., Henry, Va.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, Cincinnati, O.
Carter Paint Co., Liberty, Ind.
Chamberlin Co. of America, Detroit, Mich.
Cheeseman-Elliot Co., Inc., Brooklyn, N. Y.
Continental Products Co., Euclid, O.
Cordo Chemical Co., Norwalk, Conn.
Devoe & Raynolds Co., Inc., New York, N. Y.
Dow Corning Corp., Midland, Mich.
Eagle-Picher Co., Cincinnati, O.
Flintkote Co., The, New York, N. Y.
Ford Roofing Products Co., Chicago, Ill.
Goodrich Co., B. F., Akron, O.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia.
● Johns-Manville, New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Lastik Products Co., Inc., Pittsburgh, Pa.
Lehon Co., Chicago, Ill.
Maas & Waldstein Co., Newark, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Midland Paint & Varnish Co., Cleveland, O.
Moore Co., Goodloe E., Danville, Ill.
Mortell Co., J. W., Kankakee, Ill.
National Mfg. Corp., Tonawanda, N. Y.
Nebel Mfg. Co., Cleveland, O.
North American Fibre Products Co., The, Cleveland, O.
Ohmlac Paint & Refining Co., New York, N. Y.
Pecora Paint Co., Philadelphia, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plastic Products Co., Detroit, Mich.
Presstite Engineering Co., St. Louis, Mo.

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Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Robertson Co., H. H., Pittsburgh, Pa.
Sherwin-Williams Co., The, Cleveland, O.
Sipe & Co., James B., Pittsburgh, Pa.
Smooth-On Mfg. Co., Jersey City, N. J.
Sonneborn Sons, Inc., L., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Tamms Silica Co., Chicago, Ill.
Thompson & Co., Oakmont, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit, Mich.
United States Stoneware Co., New York, N. Y.
Wilhelm Co., A., Reading, Pa.
X-Pando Corp., Long Island City, N. Y.

COMPOUNDS, CLEANING, AIR FILTER

Oakite Products, Inc., New York, N. Y.
Turco Products, Inc., Los Angeles, Calif.

COMPOUNDS, CLEANING, PIPE COIL AND CONDENSER

Anderson-Stolz Corp., Kansas City, Mo.
Apex All Weather Products, Chicago, Ill.
● Apex Engineering Co., Chicago, Ill.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Everett, Mass.
Carolina Aniline & Extract Co., Inc., Charlotte, N. C.
Dearborn Chemical Co., Chicago, Ill.
● Dowell Inc., Tulsa, Okla.
Haering & Co., Inc., D. W., Chicago, Ill.
Hercules Chemical Co., Inc., New York, N. Y.
MacDermid Chemical Co., Bristol, Conn.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
North American Fibre Products Co., The, Cleveland, O.
Oakite Products, Inc., New York, N. Y.
Perolin Co., Inc., Chicago, Ill.
Radiator Specialty Co., Charlotte, N. C.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory Inc., Brooklyn, N. Y.
Western Chemical Co., Kansas City, Mo.

COMPOUNDS, WELDING

All-State Welding Alloys Co., Inc., White Plains, N. Y.
American Solder & Flux Co., Philadelphia, Pa.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Midland Paint & Varnish Co., Cleveland, O.
Neilson Chemical Co., Detroit, Mich.
Powder Weld Process Co., The, Brooklyn, N. Y. (Powdered)
Sight Feed Generator Co., Richmond, Ind.
Special Chemicals Corp., New York, N. Y.
Thompson & Co., Oakmont, Pa.
Turco Products, Inc., Los Angeles, Calif.
Universal Power Corp., Cleveland, O.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

COMPRESSION PIPE FITTINGS

See Fittings, Pipe, Compression

COMPRESSOR BASES

See Bases and Pads, Vibration Isolating

COMPRESSOR VALVES

See Valves, Compressor

COMPRESSORS, AIR

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Beach-Russ Co., New York, N. Y.
Binks Mfg. Co., Chicago, Ill.
Brunner Mfg. Co., Utica, N. Y.
Buffalo Turbine Corp., Buffalo, N. Y.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Circulators & Devices Mfg. Corp., New York, N. Y.
Cooper-Bessemer Corp., Mt. Vernon, O.
Cooper Co., Clark, Palmyra, N. J.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davey Compressor Co., Kent, O.
Dayton Air Compressor Co., Dayton, O.
DeVilbiss Co., The, Toledo, O.
Electric Sprayit Co., The, Sheboygan, Wis.
Essick Mfg. Co., Los Angeles, Calif.
Fuller Co., Catasauqua, Pa.
Gardner-Denver Co., Quincy, Ill
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Hobart Bros. Co., Troy, O.
● Ingersoll-Rand Co., New York, N. Y.
● Joy Mfg. Co., Pittsburgh, Pa.
Lammert & Mann Co., Chicago, Ill.
Lamson Corp., Syracuse, N. Y.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Nash Engineering Co., South Norwalk, Conn.
North Penn Co., New York, N. Y.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Piezo Mfg. Corp., New York, N. Y.
Plummer Spray Equipment Co., Napoleon, O.
Roots-Connersville Blower Corp., Connersville, Ind.
Schramm, Inc., West Chester, Pa.
Spencer Turbine Co., Hartford, Conn.
Trimount Rotary Power Co., East Dedham, Mass.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

COMPRESSORS, REFRIGERATING, CENTRIFUGAL

● Carrier Corp., Syracuse, N. Y. (Carrene)
DeLaval Steam Turbine Co., Trenton, N. J. (Water vapor)
● Trane Co., The, LaCrosse, Wis.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
● York Corp., York, Pa.

COMPRESSORS, REFRIGERATING, RECIPROCATING

Airtemp, Div. of Chrysler Corp., Dayton, O. (Radial)
Baker Ice Machine Co., Inc., South Windham, Me. ("Freon," Methyl chloride, Ammonia)
Brunner Mfg. Co., Utica, N. Y. (Methyl chloride, "Freon," sulphur dioxide)
● Carrier Corp., Syracuse, N. Y. ("Freon")
Controldtemp Equipment Sales Corp., Brooklyn, N. Y.
Coolstream Corp., Brooklyn, N. Y.
Copeland Refrigeration Corp., Sidney, O.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Diceler Div. of General Machine & Mfg. Co., Berwick, Pa.
● Frick Co., Waynesboro, Pa. (Ammonia, carbon dioxide, methyl chloride, "Freon")
Frigidaire Div., General Motors Corp., Dayton, O.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Machinery Co., Spokane, Wash.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Howe Ice Machine Co., Chicago, Ill. ("Freon," ammonia, methyl chloride)
● Ingersoll-Rand Co., New York, N. Y.
Jack & Heintz Precision Industries, Inc., Cleveland, O.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Div., Nash-Kelvinator Corp., Detroit, Mich.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Liberty Motors & Engineering Corp., Arbutus, Baltimore, Md.
Lynch Mfg. Corp., Toledo, O.
Mayflower Products, Inc., Richmond, Ind.
Mills Industries, Inc., Chicago, Ill.
Reliance Refrigerating Machine Co., Chicago, Ill. ("Freon," methyl chloride, ammonia)
Reynolds Mfg. Co., Inc., Springfield, Mo.
● Schnacke, Inc., Evansville, Ind.
Servel, Inc., Electric Refrigeration Div., Evansville, Ind. ("Freon," methyl chloride)
Starr Piano Co., Richmond, Ind.
Stewart Ice Machine Co., Pomona, Calif.
Tecumseh Products Co., Tecumseh, Mich.
● Trane Co., The, LaCrosse, Wis.
Universal Cooler Div. of International Detrola Corp., Marion, O. (Methyl chloride, "Freon")
Vilter Mfg. Co., Milwaukee, Wis. ("Freon," ammonia)
Westinghouse Electric Corp., Pittsburgh, Pa.
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill. ("Freon," methyl chloride)
Wittenmeier Machinery Co., Chicago, Ill. (Carbon dioxide)
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill. (Ammonia, methyl chloride)
● York Corp., York, Pa. (Carbon dioxide, ammonia, "Freon")

COMPRESSORS, REFRIGERATING, STEAM JET

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engrg. Co., Inc., New York, N. Y.
Elliott Co., Jeannette, Pa.
Graham Mfg. Co., Inc., New York, N. Y.

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- ● Ingersoll-Rand Co., New York, N. Y.
- Schutte & Koerting Co., Philadelphia, Pa.
- Wheeler Mfg. Co., C. H., Philadelphia, Pa.
- ● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.

COMPRESSORS, STEAM BOOSTER

- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Buffalo Turbine Corp., Buffalo, N. Y.
- Graham Mfg. Co., Inc., New York, N. Y.
- ● Ingersoll-Rand Co., New York, N. Y.
- Pennsylvania Pump & Compressor Co., Easton, Pa.
- Schutte & Koerting Co., Philadelphia, Pa.
- ● Worthington Pump & Machinery Corp., Harrison, N. J.

CONDENSATION METERS

See Meters, Condensation

CONDENSATION PUMPS

See Pumps, Condensation

CONDENSER TUBES

See Tubes, Condenser

CONDENSERS, REFRIGERATING, EVAPORATIVE

- ● Acme Industries, Inc., Jackson, Mich.
- American Blower Corp., Detroit, Mich.
- American Coils Co., Newark, N. J.
- American Cooling Tower Co., Kansas City, Mo.
- Baker Ice Machine Co., Inc., South Windham, Me.
- ● Baltimore Aircoil Co., Inc., Baltimore, Md.
- Betz Corp., Hammond, Ind.
- ● Buffalo Forge Co., Buffalo, N. Y.
- ● Carrier Corp., Syracuse, N. Y. ("Freon," ammonia)
- Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- ● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
- Doyle & Roth Mfg. Co., Long Island City, N. Y.
- Drayer & Hanson, Inc., Los Angeles, Calif.
- ● Frick Co., Waynesboro, Pa.
- Frigidaire Div., General Motors Corp., Dayton, O.
- G & O Mfg. Co., New Haven, Conn.
- ● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
- General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
- Governair Corp., Oklahoma City, Okla.
- Harry Cooling Towers, Inc., New York, N. Y.
- Hess Warming & Ventilating Co., Chicago, Ill.
- ● Kennard Corp., St. Louis, Mo.
- Kramer Trenton Co., Trenton, N. J.
- Larkin Coils, Atlanta, Ga.
- Long Mfg. Div. Borg-Warner Corp., Detroit, Mich.
- ● Marlo Coil Co., St. Louis, Mo.
- ● McQuay, Inc., Minneapolis, Minn.
- ● Murray Mfg. Co., D. J., Wausau, Wis.
- Niagara Blower Co., New York, N. Y.
- Peerless of America, Inc., Chicago, Ill.
- ● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
- Refrigeration Appliances, Inc., Chicago, Ill.
- Refrigeration Economics Co., Inc., Canton, O.
- Tenney Engineering, Inc., Newark, N. J.
- ● Trane Co., The, LaCrosse, Wis.
- Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
- ● United States Air Conditioning Corp., Minneapolis, Minn.
- Westinghouse Electric Corp., Pittsburgh, Pa.
- Vilter Mfg. Co., Milwaukee, Wis.
- ● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
- XL Refrigerating Co., Chicago, Ill.
- ● Yates-American Machine Co., Beloit, Wis.
- ● York Corp., York, Pa.
- ● Young Radiator Co., Racine, Wis.

CONDENSERS, REFRIGERATING, SHELL AND COIL

- ● Acme Industries, Inc., Jackson, Mich.
- American Coils Co., Newark, N. J.
- Baker Ice Machine Co., Inc., South Windham, Me.
- Ball Welding Works, Inc., Oakland, Calif.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Brown Fintube Co., The, Elyria, O.
- Champion Unit Heater Co., Chicago, Ill.
- Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- ● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
- Davis Engineering Corp., Elizabeth, N. J.
- Downingtown Iron Works, Downingtown, Pa.
- Doyle & Roth Mfg. Co., Long Island City, N. Y.
- Halstead & Mitchell, Pittsburgh, Pa. (Double tube)
- Nooter Boiler Works Co., John, St. Louis, Mo.
- Refrigeration Economics Co., Inc., Canton, O.
- Rome-Turney Radiator Co., Rome, N. Y.
- Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
- Vilter Mfg. Co., Milwaukee, Wis.
- Westinghouse Electric Corp., Pittsburgh, Pa.
- Whitlock Mfg. Co., Hartford, Conn.
- ● York Corp., York, Pa.
- ● Young Radiator Co., Racine, Wis.

CONDENSERS, REFRIGERATING, SHELL AND TUBE

- ● Acme Industries, Inc., Jackson, Mich.
- Airtemp, Div. of Chrysler Corp., Dayton, O.
- ● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- American Coils Co., Newark, N. J.
- Andale Co., Philadelphia, Pa.
- Baker Ice Machine Co., Inc., South Windham, Me.
- Ball Welding Works, Inc., Oakland, Calif.
- ● Bell & Gossett Co., Morton Grove, Ill.
- Biggs Boiler Works Co., E. Akron, O.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Brown Fintube Co., The, Elyria, O.
- ● Carrier Corp., Syracuse, N. Y. (Carrene)
- Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- ● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
- Davis Engineering Corp., Elizabeth, N. J.
- Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
- Downingtown Iron Works, Downingtown, Pa.
- Doyle & Roth Mfg. Co., Long Island City, N. Y.
- Drayer & Hanson, Inc., Los Angeles, Calif.
- ● Frick Co., Waynesboro, Pa.
- Frigidaire Div., General Motors Corp., Dayton, O.
- ● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
- General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
- Heat Transfer Products, Inc., Carbondale, Pa.
- Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
- Howe Ice Machine Co., Chicago, Ill.
- Kramer Trenton Co., Trenton, N. J.
- National Radiator Co., The, Johnstown, Pa.
- Nooter Boiler Works Co., John, St. Louis, Mo.
- Ohio Pipe Bending & Machine Co., Cleveland, O.
- ● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
- ● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
- Refrigeration Economics Co., Inc., Canton, O.
- Refrigeration Engineering Corp., Philadelphia, Pa.
- Reliance Refrigerating Machine Co., Chicago, Ill.
- Reynolds Mfg. Co., Inc., Springfield, Mo.
- Richmond Engrg. Co., Inc., Richmond, Va.
- Roessing Mfg. Co., Pittsburgh, Pa.
- Rome-Turney Radiator Co., Rome, N. Y.
- Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
- ● Schnacke, Inc., Evansville, Ind.
- Servel, Inc., Electric Refrigeration Div., Evansville, Ind.
- Standard Heater & Oil Equipment Co., Jersey City, N. J.
- Stewart Ice Machine Co., Pomona, Calif.
- ● Trane Co., The, LaCrosse, Wis.
- Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
- Union Steam Pump Co., Battle Creek, Mich.
- Vilter Mfg. Co., Milwaukee, Wis.
- Vogt Machine Co., Henry, Louisville, Ky.
- Westinghouse Electric Corp., Pittsburgh, Pa.
- Whitlock Mfg. Co., Hartford, Conn.
- Whittenmeier Machinery Co., Chicago, Ill.
- ● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
- X L Refrigerating Co., Chicago, Ill.
- ● York Corp., York, Pa.
- ● Young Radiator Co., Racine, Wis.

CONDENSERS, WATER DISTRIBUTORS FOR

See Distributors, Water, for Condensers

CONDENSING UNITS

See Compressors

CONDUCTORS, ELECTRICAL, FOR RADIANT HEATING

- Crittall Radiant Heating, Inc., Richard, New York, N. Y.
- Roberson Co., L. N., Seattle, Wash.

CONDUIT, UNDERGROUND PIPING

- ● American District Steam Co., North Tonawanda, N. Y.
- Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
- Dockstader, Inc., S. E., Washington, D. C.
- ● Durant Insulated Pipe Co., Palo Alto, Calif.
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Fibre Conduit Co., Orangeburg, N. Y.
- ● Johns-Manville, New York, N. Y.
- Kaiser Co., E. B., Chicago, Ill.
- Michigan Pipe Co., Bay City, Mich.

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- • Porter & Co., Inc., H. W., Newark, N. J.
- • Ric-wiL Co., Cleveland, O.
- • Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
- Underground Steam Construction Co., Boston, Mass.
- Wyckoff & Son Co., A., Elmira, N. Y.

CONNECTIONS, DUCT, FLEXIBLE (ASBESTOS, CANVAS, ETC.)

- • Bauer & Black, Div. of the Kendall Co., Chicago, Ill.
- Canvas Products Co., St. Louis, Mo.
- Chicago Metal Hose Corp., Maywood, Ill.
- Felters Company, The, Boston, Mass.
- • Grant Wilson, Inc., Chicago, Ill.
- St. Clair Rubber Co., Detroit, Mich.
- United States Rubber Co., New York, N. Y.
- Wagner Awning & Mfg. Co., Cleveland, O.
- • Wilson, Inc., Grant, Chicago, Ill. (Asbestos)

CONNECTORS, FILLING, HYDROSTATIC TEST

- Mechanical Products Corp., Chicago, Ill.
- Roylyn Inc., Glendale, Calif.

CONNECTORS, FOR NON-METALLIC DUCT FABRICATION

- Acme Steel Co., Chicago, Ill. (Strapping)
- • Dravo Corp., Pittsburgh, Pa.
- Klomparens Lock-Joint Mfg. Co., Inc., Washington, D. C.
- Lumm Co., A. H., Toledo, O.
- Sheetlock Co., Chicago, Ill.
- United States Rubber Co., New York, N. Y.

CONTINUOUS HEATERS

See Heaters, Steam Jet, for Liquids

CONTROL, FOR INDIRECT WATER HEATERS

- Armstrong Control Co., Inc., Portland, Ore.
- • Barber-Colman Co., Rockford, Ill.
- • Bell & Gossett Co., Morton Grove, Ill.
- d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
- • Detroit Lubricator Co., Detroit, Mich.
- Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
- • Hoffman Specialty Co., Indianapolis, Ind.
- Klipfel Mfg. Co., Hamilton, O.
- • Mercoid Corp., The, Chicago, Ill.
- • Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- • Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee, Wis.
- • Sarco Co., Inc., New York, N. Y.
- Sarcotherm Controls, Inc., New York, N. Y.
- • Taco Heaters, Inc., New York, N. Y.
- • Thrush & Co., H. A., Peru, Ind.

CONTROLLERS AND STARTERS, MOTOR

- • Allen-Bradley Co., Milwaukee, Wis.
- • Allis-Chalmers Mfg. Co., Milwaukee, Wis.
- Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
- Automatic Temperature Control Co., Inc., Philadelphia, Pa.
- B/W Controller Corp., Birmingham, Mich.
- Borg-Erickson Corp., Chicago, Ill.
- Chase-Shawmut Co., Newburyport, Mass.
- Clark Controller Co., Cleveland, O.
- Cooper Co., Clark, Palmyra, N. J.
- Cutler-Hammer, Inc., Milwaukee, Wis.
- Electric Controller & Mfg. Co., Cleveland, O.
- Electric Machinery Co., Minneapolis, Minn. (Synchronous motor)
- General Electric Co., Apparatus Dept., Schenectady, N. Y.
- Guardian Electric Mfg. Co., Chicago, Ill.
- Hart Mfg. Co., Hartford, Conn.
- Monitor Controller Co., The, Baltimore, Md.
- Redmond Co., Inc., Owosso, Mich.
- Reynolds Electric Co., Chicago, Ill.
- Square D Co., Industrial Controller Div., Milwaukee, Wis.
- Trumbull Electric Mfg. Co., The, Plainville, Conn.
- Ward Leonard Electric Co., Mt. Vernon, N. Y.
- Westinghouse Electric Corp., Pittsburgh, Pa.
- Zenith Electric Co., Chicago, Ill.

CONTROLS, AIR CONDITIONING

See Humidistats; Indicator-Controllers; Operators, Dampers; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Thermostats; Valves, Diaphragm; Valves, Refrigeration; Valves, Solenoid

CONTROLS, DOOR, ELECTRIC EYE (FOR AIR CONDITIONED ROOMS)

- Electric Service Control, Inc., Newark, N. J.
- Ess Specialty Corp., Bergenfield, N. J.
- Furst Electronics, Chicago, Ill.
- Stanley Works, The, New Britain, Conn.
- Westinghouse Electric Corp., Pittsburgh, Pa.
- Yale & Towne Mfg. Co., Stamford, Conn.

CONTROLS, DRAFT, BAROMETRIC

- Atlas Utilities Co., Inc., Providence, R. I.
- • Barber-Colman Co., Rockford, Ill.
- Bristol Co., The, Waterbury, Conn.
- Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
- Campbell Engineering Co., Appleton, Wis.
- Cole-Sewell Engineering Co., St. Paul, Minn.
- Field Control Div., H. D. Conkey & Co., Mendota, Ill.
- Fuelguard Co., Dallas, Tex.
- Hotstream Heater Co., Cleveland, O.
- • Krueger Sentry Gauge Co., Green Bay, Wis.
- Perfex Corp., Milwaukee, Wis.
- Preferred Utilities Mfg. Corp., New York, N. Y.
- Sarcotherm Controls, Inc., New York, N. Y.
- Simplex Mfg. Co., Fond du Lac, Wis.

CONTROLS, FIRE PROTECTION SPRINKLER SYSTEMS

- American District Telegraph Co., New York, N. Y.
- • Barber-Colman Co., Rockford, Ill.
- Cook Electric Co., Diaphlex Div., Chicago, Ill.
- • Grinnell Co., Inc., Providence, R. I.
- Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
- Rockwood Sprinkler Co., Worcester, Mass.
- Synchro-Start Products, Inc., Chicago, Ill.
- Worner Electronic Devices, Rankin, Ill.

CONTROLS, FLAME FAILURE

- American District Telegraph Co., New York, N. Y.
- Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
- Combustion Control Corp., Cambridge, Mass.
- Ess Specialty Corp., Bergenfield, N. J.
- Fuelguard Co., Dallas, Tex.
- Furst Electronics, Chicago, Ill.
- • General Controls Co., Glendale, Calif.
- Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
- • Mercoid Corp., The, Chicago, Ill.
- • Mettler Co., Lee B., Los Angeles, Calif.
- • Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- • Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee, Wis.
- • Webster Engineering Co., Tulsa, Okla.
- Wheelco Instruments Co., Chicago, Ill.
- White Mfg. Co., St. Paul, Minn.
- • White-Rodgers Electric Co., St. Louis, Mo.

CONTROLS, HEATING

See Alarms; Humidistats; Indicator-Controllers; Operators, Damper; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Systems, Combustion Control; Systems, Heating; Thermostats; Valves, Balancing, Radiator; Valves, Diaphragm; Valves, Flow Control; Valves, Mixing; Valves, Pressure Reducing and Regulating; Valves, Radiator; Valves, Solenoid

CONTROLS, PUSH-PULL

See Shafts, Flexible, Push-Pull, for Control

CONTROLS, REFRIGERATION

See Humidistats; Operators, Valves; Relays; Switches; Thermostats; Valves, Refrigeration; Valves, Solenoid

CONVECTOR ENCLOSURES

See Enclosures, Convector

CONVECTORS

See Radiation, Convection Type

CONVEYORS, COAL AND ASH

- Chain Belt Co., Milwaukee, Wis.
- Farquhar Co., A. B., York, Pa.
- Jeffrey Mfg. Co., Columbus, O.
- • Joy Mfg. Co., Pittsburgh, Pa.
- Link-Belt Co., Chicago, Ill.

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Sprout, Waldron & Co., Muncy, Pa.
Standard Transmission Equipment Co., Los Angeles, Calif.
● Stephens-Adamson Mfg. Co., Aurora, Ill.

COOLERS, CRANE CAB

● Dravo Corp., Machinery Div., Pittsburgh, Pa.
● Trane Co., The, LaCrosse, Wis.

COOLERS, OIL

Andale Co., Philadelphia, Pa.
● American District Steam Co., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
G & O Mfg. Co., New Haven, Conn.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, New York, N. Y.
Halstead & Mitchell, Pittsburgh, Pa.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Pipe Bending Co., New Haven, Conn.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Perfex Corp., Milwaukee, Wis.
Refrigeration Economics Co., Inc., Canton, O.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Struthers Wells Corp., Titusville, Pa.
● Trane Co., The, LaCrosse, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Whitlock Mfg. Co., Hartford, Conn.
Winslow Engineering Co., Oakland, Calif.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

COOLERS, UNIT (FLOOR TYPE)

Not air conditioning units, but floor mounted unit with coil and centrifugal fans without filters, for connection to remote compressor or cold water supply. For air conditioning units see Units, Air Conditioning

● Acme Industries, Inc., Jackson, Mich.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Baker Ice Machine Co., Inc., South Windham, Me.
Beacon-Morris Corp., Boston, Mass. (Custom built)
● Buffalo Forge Co., Buffalo, N. Y.
● Bush Mfg. Co., Hartford, Conn.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Conditionaire Unit Co., Chicago, Ill.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Economy Equipment Co., Chicago, Ill.
● Frick Co., Waynesboro, Pa.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
Manufacturers Fin Coil Co., Chicago, Ill.
● Marlo Coil Co., St. Louis, Mo.
Mayflower Products, Inc., Richmond, Ind.
● McQuay, Inc., Minneapolis, Minn.
● Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

COOLERS, UNIT (SUSPENDED TYPE)

Not air conditioning units, but suspended unit with coil and propeller fan, without filters, for connection to remote compressor or cold water supply. For air conditioning units, see Units, Air Conditioning

American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
American Cooling Tower Co., Kansas City, Mo.
Baker Ice Machine Co., Inc., South Windham, Me.
Beacon-Morris Corp., Boston, Mass. (Custom built)
Bern's Specialty Mfg. Co., Chicago, Ill.
Betz Corp., Hammond, Ind.
● Buffalo Forge Co., Buffalo, N. Y.
● Bush Mfg. Co., Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Conditionaire Unit Co., Chicago, Ill.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Economy Equipment Co., Chicago, Ill.
● Fedders-Quigan Corp., Buffalo, N. Y.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
● Ilg Electric Ventilating Co., Chicago, Ill.
Johnson Fan & Blower Corp., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
Manufacturers Fin Coil Co., Chicago, Ill.
● Marlo Coil Co., St. Louis, Mo.
Mayflower Products, Inc., Richmond, Ind.
● McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
● Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
● Skinner Heating & Ventilating Co., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Tenney Engineering, Inc., Newark, N. J.
Thermal Co., Inc., Milwaukee, Wis.
● Trane Co., The, La Crosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wilson Engineering Corp., Chicago, Ill.
● Wing Mfg. Co., L. J., New York, N. Y.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

COOLERS, WATER, DRINKING

Coolstream Corp., The, Brooklyn, N. Y.
Copeland Refrigeration Corp., Sidney, O.
Day & Night Mfg. Co., Refrigeration Div., Monrovia, Calif.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Filtrine Mfg. Co., Brooklyn, N. Y.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Halstead & Mitchell, Pittsburgh, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Refrigeration Engineering Corp., Philadelphia, Pa.
Temprite Products Corp., Detroit, Mich.
Uniflow Mfg. Co., Erie, Pa.
Westinghouse Electric Corp., Pittsburgh, Pa.

COOLING COILS

See Surface, Cooling

COOLING SURFACE

See Surface, Cooling

COOLING TOWERS

See Towers, Cooling

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COOLING UNITS

See Units, Air Conditioning; Coolers, Unit

COPPER PIPE

See Pipe, Brass and Copper

COPPER SHEETS

See Sheets, Copper

COPPER TUBE FITTINGS

See Fittings, Copper Tube

COPPER TUBE FITTINGS, FLARED

See Fittings, Copper Tube, Flared

COPPER TUBING

See Tubing, Brass and Copper

CORROSION PREVENTIVES

See Treatment, Steam System, to Inhibit Corrosion; and Treatment, Water, to Inhibit Corrosion

COUNTERS, DUST

Bausch & Lomb Optical Co., Rochester, N. Y.
Service to Industry, West Hartford, Conn.
Willson Products, Inc., Reading, Pa.

COUPLINGS, FLEXIBLE, POWER TRANSMISSION

Ajax Flexible Coupling Co., Westfield, N. Y.
American Flexible Coupling Co., Erie, Pa.
Blood Brothers Machine Co., Allegan, Mich. (Universal joints)
Boston Gear Wks., Inc., North Quincy, Mass.
Brooks Equipment Corp., Hoboken, N. J.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Certified Flexible Couplings, New York, N. Y.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Congress Drives Div., Tann Corp., Detroit, Mich.
Continental Diamond Fibre Co., Newark, Del.
Crocker-Wheeler Electric Mfg. Co. Div., Joshua Hendy Iron Works, Ampere, N. J.
Davidson Co., M. T., Brooklyn, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Guardian Products Corp., Michigan City, Ind.
Irving Flexible Coupling Co., Los Angeles, Calif.
Jeffrey Mfg. Co., Columbus, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Koppers Co., Inc., Bartlett Hayward Div., Baltimore, Md.
Link-Belt Co., Indianapolis, Ind.
● Lord Mfg. Co., Erie, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Medart Co., St. Louis, Mo.
Mercury Clutch Div., Automatic Products Corp., Canton, O. (Automatic centrifugal clutch)
Moran Flexible Joint Co., Inc., Louisville, Ky.
Morse Chain Co., Ithaca, N. Y.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Poole Foundry & Machine Co., Baltimore, Md.
Ramsey Chain Co., Inc., Albany, N. Y.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
Shallcross Co., Philadelphia, Pa.
Sprout, Waldron & Co., Muncy, Pa.
Stewart-Rogers, Inc., Philadelphia, Pa.
Stow Mfg. Co., Binghamton, N. Y.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Waldron Corp., John, New Brunswick, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whitney Chain & Mfg. Co., The, Hartford, Conn.
Wood's Sons Co., T. B., Chambersburg, Pa.

COUPLINGS, PIPE

Aeroquip Corp., Jackson, Mich.
Alabama Pipe Co., Anniston, Ala. (Cast iron)
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Chase Brass & Copper Co., Waterbury, Conn.
Champion Machine & Forging Co., Cleveland, O.
Clow & Sons, James B., Chicago, Ill.
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (Stainless)
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Dillon Co., Tulsa, Okla.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Drinkwater, Inc., Waukegan, Ill.
● Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
● Kennedy Valve Mfg. Co., Elmira, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
Malleable Iron Fittings Co., Branford, Conn.
Mueller Brass Co., Port Huron, Mich.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Rhode Island Fittings Co., Hillsgrove, R. I.
Semler Co., Jeannette, Pa.
Stockham Pipe Fittings Co., Birmingham, Ala.
Stokes Molded Products, Trenton, N. J. (Hard rubber)
Superior Railway Products Corp., Pittsburgh, Pa.
Union Metal Works, Chelsea, Mass.
United States Stoneware Co., New York, N. Y.
Victaulic Co. of America, New York, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
● Watson-Stillman Co., Roselle, N. J.
Weatherhead Co., Cleveland, O.
Wheeling Machine Products Co., Wheeling, W. Va.
● Youngstown Sheet & Tube Co., Youngstown, O.

COUPLINGS, PIPE, DETACHABLE

Aeroquip Corp., Jackson, Mich.
Drinkwater, Inc., Waukegan, Ill.
Gates Engineering Co., Wilmington, Del.
Packless Metal Products Corp., New Rochelle, N. Y.
Roylyn, Inc., Glendale, Calif.
Victaulic Co. of America, New York, N. Y.
Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.

CRANE CAB COOLERS

See Coolers, Crane Cab

CUT-OFFS, LOW WATER, HEATING BOILER

B/W Controller Corp., Birmingham, Mich.
Combustion Control Corp., Cambridge, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
● General Controls Co., Glendale, Calif.
● Johnson Corp., The, Three Rivers, Mich.
Magnetrol, Inc., Chicago, Ill.
● Maid-O-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
● Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Watts Regulator Co., Lawrence, Mass.
● Webster & Co., Warren, Camden, N. J.

CUTTERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Atkins & Co., E. C., Indianapolis, Ind.
Barnes Tool Co., The, New Haven, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Bernz Co., Inc., Otto, Rochester, N. Y.
C-B Tool Co., Lancaster, Pa.
Continental Machine Co., Chicago, Ill.
Crown Die & Tool Co., Chicago, Ill.
Erie Tool Works, Erie, Pa.
Everhot Products Co., Chicago, Ill.
Hollands Mfg. Co., Erie, Pa.
International Nutyp Tool Co., Oswego, N. Y.
Landis Machine Co., Inc., Waynesboro, Pa.
National Machine Wks., Chicago, Ill.
Nye Tool & Machine Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
● Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.
Trimount Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.

CUTTERS, TUBING

Armstrong Bros. Tool Co., Chicago, Ill.

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Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Bernz Co., Inc., Otto, Rochester, N. Y.
● Bonney Forge & Tool Works, Allentown, Pa.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Continental Machine Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Landis Machine Co., Inc., Waynesboro, Pa.
Machine-Craft Mfg. Co., Los Angeles, Calif.
Mueller Brass Co., Port Huron, Mich.
Nye Tool & Machine Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
● Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Weatherhead Co., Cleveland, O.

DAMPER OPERATORS

See Operators, Damper

DAMPER REGULATORS

See Regulators, Damper Sets

DAMPERS, DUCT, MANUALLY OPERATED

Acme Mfg. Co., Philadelphia, Pa.
Adams Co., The, Dubuque, Ia.
● Air Conditioning Products Co., Detroit, Mich.
Air Control Products, Inc., Coopersville, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
Corbman Bros., Inc., Philadelphia, Pa.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Excelsior Steel Furnace Co., Chicago, Ill.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Inland Steel Products Co., Milwaukee, Wis.
Jacobs Co., B. & J., Cincinnati, O.
Kerentoff, G. L., Cincinnati, O.
Martens & Stormoen, Boston, Mass.
Meyer Mfg. Co., Detroit, Mich.
Ohio Products Co., Cleveland, O.
Salina Metal Products Co., Salina, Kan.
Sioux Steel Co., Sioux Falls, S. D.
Standard Furnace & Supply Co., Omaha, Neb.
Thermix Corp., The, Greenwich, Conn.
United States Register Co., Battle Creek, Mich.
Young Regulator Co., Cleveland, O.

DAMPERS, DUCT, REMOTE CONTROLLED

● Air Conditioning Products Co., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
● Anemostat Corp. of America, New York, N. Y.
● Autempco Corp., New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
● Johnson Service Co., Milwaukee, Wis.
Meyer Mfg. Co., Detroit, Mich.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Chicago, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.
Stuart Co., W. W., Des Moines, Ia.
Thermix Corp., The, Greenwich, Conn.
● Tuttle & Bailey, Inc., New Britain, Conn.
Vapor Car Heating Co., Inc., Chicago, Ill.
Young Regulator Co., Cleveland, O.

DAMPERS, PULSATION, FOR PIPING SYSTEMS

Campbell Co., J. A., Long Beach, Calif.
Taylor Instrument Companies, Rochester, N. Y.

DEAERATORS

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Buflovac Equipment Div. of Blaw-Knox Co., Buffalo, N. Y.
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engrg. Co., Inc., New York, N. Y.
Elliott Co., Jeannette, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Heat Transfer Products, Inc., Carbondale, Pa.
Hoppes Mfg. Co., Inc., Springfield, O.
Permutit Co., New York, N. Y.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
● Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
Whitlock Mfg. Co., Hartford, Conn.
● Worthington Pump & Machinery Corp., Harrison, N. J.

DEEP WELL PUMPS

See Pumps, Deep Well

DEHUMIDIFIERS, ABSORPTION AND ADSORPTION

● Air & Refrigeration Corp., New York, N. Y.
Aqua-Sorb Co., East Orange, N. J.
● Bryant Heater Co., Cleveland, O.
Carbide and Carbon Chemicals Corp., New York, N. Y. (Triethylene Glycol)
Cargocaire Engineering Corp., New York, N. Y. (for ships)
● Carrier Corp., Syracuse, N. Y.
Davison Chemical Corp., The, Baltimore, Md.
Dow Chemical Co., The, Midland, Mich.
Dry Air Products Corp., Washington, D. C.
Drying Systems, Inc., Chicago, Ill.
Floridin Co., Warren, Pa.
● Kaufman Co., H. J., Detroit, Mich.
Morf Industries, Inc., Staten Island, N. Y.
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Rogers Air Conditioning Div., New York, N. Y. (Triethylene glycol)
Socony Vacuum Oil Co., Inc., New York, N. Y.
Solvay Sales Corp., New York, N. Y.
Somers, Inc., Detroit, Mich.
● Surface Combustion Corp., Toledo, O.
Tamms Silica Co., Chicago, Ill.

DEHUMIDIFYING UNITS

See Units, Air Conditioning; Dehumidifiers, Absorption and Adsorption

DEHYDRANT AND ACID NEUTRALIZER, FOR REFRIGERATING SYSTEMS

Davison Chemical Corp., The, Baltimore, Md.
Highside Chemicals Co., Newark, N. J.
Mueller Brass Co., Port Huron, Mich.
Weatherhead Co., Cleveland, O.

DEHYDRATORS, REFRIGERANT

● Aluminum Co. of America, Pittsburgh, Pa.
American Injector Co., Detroit, Mich.
● Automatic Products Co., Milwaukee, Wis.
Davison Chemical Corp., The, Baltimore, Md.
Electrimatic, Chicago, Ill.
Floridin Co., Warren, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
Gasflux Co., Mansfield, O.
● Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Joliet Chemicals, Inc., Joliet, Ill.
McIntire Connector Co., Newark, N. J.
Mueller Brass Co., Port Huron, Mich.
Remco, Inc., Zelienople, Pa.
● Sporlan Valve Co., St. Louis, Mo.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Wabash Mfg. Co., Chicago, Ill.
Weatherhead Co., Cleveland, O.
Western Thermal Equipment Co., Los Angeles, Calif.

DESTROYERS, SOOT, CHEMICAL

Ampion Corp., Long Island City, N. Y.
Celco Corp., New York, N. Y.
Coughlan Co., G. N., West Orange, N. J.
Desolvo Co., The, Pittsburgh, Pa.
Diamond Chemical Products, New York, N. Y.
Elraco Engineering Co., Los Angeles, Calif.
Healy Ruff Co., St. Paul, Minn.
Hercules Chemical Co., Inc., New York, N. Y.
MacDermid Chemical Co., Bristol, Conn.
O'Brien Industries, Jersey City, N. J.
Perolin Co., Inc., Chicago, Ill.
Ridgefield Chemical Products Co., Inc., Ridgefield, N. J.
Saverite Engineering Co., Hoboken, N. J.
Tamms Silica Co., Chicago, Ill.
Vinco Co., Inc., The, New York, N. Y.

DESUPERHEATERS, STEAM

● Babcock & Wilcox Co., New York, N. Y.
Brown Fintube Co., The, Elyria, O.
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Drico Industrial Corp., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
● Hagan Corp., Pittsburgh, Pa.
Northern Equipment Co., Erie, Pa.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Whitlock Mfg. Co., Hartford, Conn.

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DETECTORS, LEAK, REFRIGERANT

Bernz Co., Inc., Otto, Rochester, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Emergency Equipment Co., Newark, N. J.
Highside Chemicals Co., Newark, N. J.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Turco Products, Inc., Los Angeles, Calif.
Turner Brass Wks, Sycamore, Ill.
Western Thermal Equipment Co., Los Angeles, Calif.

DEW POINT INDICATORS

See Indicators, Dew Point

DIAPHRAGM VALVES

See Valves, Diaphragm

DIESEL ENGINES

See Engines, Diesel, for Fan, Pump and Compressor Drives

DIFFUSERS, AIR, HIGH VELOCITY

See also Grilles; Panels, Perforated, for Air Diffusion; Registers

A-J Mfg. Co., Kansas City, Mo.
● Air Devices, Inc., New York, N. Y.
Aladdin Heating Corp., Oakland, Calif.
● Anemostat Corp. of America, New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
● Connor Engineering Corp., W. B., New York, N. Y.
Demuth & Sons, Charles, Mineola, L. I., N. Y.
● Titus Mfg. Corp., Waterloo, Ia.
● Tuttle & Bailey, Inc., New Britain, Conn.

DIFFUSION, AIR

See Panels, Perforated, for Air Diffusion

DISTRIBUTORS, WATER, FOR CONDENSERS

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Martocello & Co., Jos. A., Philadelphia, Pa.
● York Corp., York, Pa.

DOOR CONTROLS

See Controls, Door, Electric Eye

DOORS AND PANELS, ACCESS

American Foundry & Furnace Co., Bloomington, Ill.
American Sheet Metal Works, New Orleans, La.
● Auer Register Co., Cleveland, O.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Camloc Fastener Corp., New York, N. Y. (Fasteners for)
● Clarage Fan Co., Kalamazoo, Mich.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Decatur Iron & Steel Co., Decatur, Ala.
Falstrom Co., Passaic, N. J.
Inland Steel Products Co., Milwaukee, Wis.
Kirk & Blum Mfg. Co., Cincinnati, O.
Lockjoint Wood Products Co., Wichita, Kan.
Lumm Co., A. H., Toledo, O.
Rock Island Register Co., Rock Island, Ill.
Technical Ply-Woods, Chicago, Ill.
Truscon Steel Co., Youngstown, O.
Walsh-Spencer Co., Boston, Mass.
Western Wire & Iron Works, Inc., Chicago, Ill. (Metal)

DRAFT CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAFT GAGES

See Gages, Indicating, Draft

DRAFT RECORDERS

See Recorders, Draft

DRAFT REGULATORS

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAWING TEMPLATES, PIPING

See Templates, Drawing, Piping

DRIERS

See Dehydrators, Refrigerant

DRILLS, ELECTRIC AND PNEUMATIC, PORTABLE

Albertson & Co., Inc., Sioux City, Ia.
● Black & Decker Mfg. Co., Towson, Md.
Chicago Pneumatic Tool Co., New York, N. Y.
Cincinnati Electrical Tool Co., The, Cincinnati, O.
Clark, Jr., Electric Co., Jas., Louisville, Ky.
Duro Metal Products Co., Chicago, Ill.
Independent Pneumatic Tool Co., Chicago, Ill.
● Ingersoll-Rand Co., New York, N. Y.
Mall Tool Co., Chicago, Ill.
Millers Falls Co., Greenfield, Mass.
Misener Mfg. Co., Inc., Syracuse, N. Y.
Paramount Products Co., New York, N. Y.
Portable Electric Tools, Inc., Chicago, Ill.
Signal Electric Mfg. Co., Menominee, Mich.
Skilsaw, Inc., Chicago, Ill.
Speedway Mfg. Co., Chicago (Cicero), Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Stanley Works, The, New Britain, Conn.
Syntron Co., Homer City, Pa.
U. S. Electrical Tool Co., Cincinnati, O.
Van Dorn Electric Tool Co., Towson, Md.
Willy's Carbide Tool Co., Detroit, Mich.
Wodack Electric Tool Corp., Chicago, Ill.

DRIVES, CHAIN

Caldwell Co., W. E., Louisville, Ky.
Chain Belt Co., Milwaukee, Wis.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Horton Mfg. Co., Minneapolis, Minn.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Morse Chain Co., Ithaca, N. Y.
Ramsey Chain Co., Inc., Albany, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Whitney Chain & Mfg. Co., The, Hartford, Conn.

DRIVES, FLAT BELT

See also Belting, Leather and Belting, Rubber

American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Chicago Belting Co., Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., The, Denver, Colo.
Horton Mfg. Co., Minneapolis, Minn.
Medart Co., St. Louis, Mo.
Remco Products Corp., York, Pa.
● Rhoads & Sons, J. E., Philadelphia, Pa.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
Williams & Son, I. B., Dover, N. H.
Wood's Sons Co., T. B., Chambersburg, Pa.

DRIVES, V BELT

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Congress Drives Div., Tann Corp., Detroit, Mich.
Continental Rubber Wks, Erie, Pa.
Dayton Rubber Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., The, Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga.
Goodrich Co., B. F., Akron, O.
Horton Mfg. Co., Minneapolis, Minn.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Remco Products Corp., York, Pa.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
Salsbury Motors, Inc., Pomona, Calif.
Thermoid Co., Trenton, N. J.
V-Belt Clutch Co., Los Angeles, Calif.
Wood's Sons Co., T. B., Chambersburg, Pa.
● Worthington Pump & Machinery Corp., Harrison, N. J.

DRIVES, VARIABLE SPEED

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

DRYERS, INDUSTRIAL (COMPARTMENT, TUNNEL CONVEYOR, VACUUM, SPRAY, ROTARY, ETC.)

Bowen Engineering Corp., Garwood, N. J.
Buflovac Equipment Div. of Blaw-Knox Co., Buffalo, N. Y.
● Campbell Heating Co., Des Moines, Ia.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Despatch Oven Co., Minneapolis, Minn.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.

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- Economy Equipment Co., Chicago, Ill.
- ● Enterprise Engine & Foundry Co., San Francisco, Calif.
- Hersey Mfg. Co., South Boston, Mass.
- Instant Drying Corp., New York, N. Y.
- Jeffrey Mfg. Co., Columbus, O.
- Kirk & Blum Mfg. Co., Cincinnati, O.
- Link-Belt Co., Indianapolis, Ind.
- Louisville Drying Machinery Co., Louisville, Ky.
- Peters-Dalton, Inc., Detroit, Mich.
- Proctor & Schwartz, Inc., Philadelphia, Pa.
- Raymond Pulverizer Div., Combustion Engineering Co., Chicago, Ill.
- Ross Engineering Corp., J. O., New York, N. Y.
- Shallcross Controls, Inc., Milwaukee, Wis.
- Stokes Machine Co., F. J., Philadelphia, Pa.
- Valley Foundry & Machine Works, Inc., Fresno, Calif.
- Western Precipitation Corp., Los Angeles, Calif.
- Westinghouse Electric Corp., Pittsburgh, Pa.

DUAL THERMOSTATS

See Thermostats, Two Temperature or Dual

DUCT CONNECTIONS

See Connections, Duct, Flexible; Connectors for Non-Metallic Duct Fabrication

DUCT FURNACES

See Furnaces, Duct

DUCT HEATERS

See Heaters, Duct

DUCT INSULATION

See Insulation, Duct

DUCT THERMOSTATS

See Thermostats, Duct Type

DUCT TURNING VANES

See Vanes, Duct Turning, Prefabricated

DUCTS AND DUCT FITTINGS, PREFABRICATED, METALLIC

- Acer & Whedon, Inc., Medina, N. Y.
- Acme Mfg. Co., Philadelphia, Pa.
- Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- American Ventilating Hose Co., New York, N. Y.
- Champion Furnace Pipe Co., Peoria, Ill.
- Char-Gale Mfg. Co., Minneapolis, Minn.
- Chicago Furnace Supply Co., Chicago, Ill.
- Chicago Metal Hose Corp., Maywood, Ill.
- ● Clayton & Lambert Mfg. Co., Louisville, Ky.
- Corbman Bros., Inc., Philadelphia, Pa.
- Excelsior Steel Furnace Co., Chicago, Ill.
- General Corporation, Minneapolis, Minn.
- Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
- Gray Metal Products, Inc., Rochester, N. Y.
- Henry Furnace Co., The, Medina, O.
- Howes-Woods Co., Cambridge, Mass.
- Inland Steel Products Co., Milwaukee, Wis.
- International Heater Co., Utica, N. Y.
- Jacobs Co., B. & J., Cincinnati, O.
- Littleford Bros., Inc., Cincinnati, O.
- Meyer & Bro. Co., F., Peoria, Ill.
- Moncrief Furnace Co., Atlanta, Ga.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Schecter Brothers Co., Philadelphia, Pa.
- Sheet Metal Mfg. Co., Inc., Brooklyn, N. Y.
- Sioux Steel Co., Sioux Falls, S. D.
- Smith-Raymond Co., Columbus, Ga.
- Standard Furnace & Supply Co., Omaha, Neb.
- United States Register Co., Battle Creek, Mich.
- Van Noorden Co., E., Boston, Mass.
- Viking Mfg. Corp., Cleveland, O.
- Waverly Heating Supply Co., Boston, Mass.
- Williamson Heater Co., Cincinnati, O.

DUCTS AND DUCT FITTINGS, PREFABRICATED, NON-METALLIC

- Carey Mfg. Co., Philip, Cincinnati, O.
- du Pont de Nemours & Co., E. I., Fabrics & Finishes Dept., Wilmington, Del.
- Jacobs Co., B. & J., Cincinnati, O.
- Knight, Maurice A., Akron, O. (acid fumes)
- Smith-Raymond Co., Columbus, Ga.
- United States Rubber Co., New York, N. Y.
- Warner Bros. Co., Spiratube Div., Bridgeport, Conn.
- Wiremold Co., The, Hartford, Conn.

DUST COLLECTORS

See Collectors, Dust

DUST COUNTERS

See Counters, Dust

ECONOMIZERS, FUEL

- ● Babcock & Wilcox Co., New York, N. Y.
- Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
- Combustion Engineering Co., Inc., New York, N. Y.
- Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Edge Moor Iron Works, Inc., Edge Moor, Del.
- Foster Wheeler Corp., New York, N. Y.
- Fuel Savers, Inc., Harrisburg, Pa.
- Green Fuel Economizer Co., Beacon, N. Y.
- Richmond Engineering Co., Inc., Richmond, Va.
- Springfield Boiler Co., Springfield, Ill.

EJECTORS, SEWAGE

- American-Marsh Pumps, Inc., Battle Creek, Mich.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Chicago Pump Co., Chicago, Ill.
- Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Cooper Co., Clark, Palmyra, N. J.
- Davidson Co., M. T., Brooklyn, N. Y.
- ● Economy Pumps, Inc., Hamilton, O.
- ● Nash Engineering Co., South Norwalk, Conn.
- Penberthy Injector Co., Detroit, Mich.
- Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
- Schutte & Koerting Co., Philadelphia, Pa.
- Swaby Mfg. Co., Chicago, Ill.
- Taber Pump Co., Inc., Buffalo, N. Y.
- ● Weil Pump Co., Chicago, Ill.
- Yeomans Bros. Co., Chicago, Ill.

ELBOWS, BALANCING, FOR HOT WATER HEATING SYSTEMS

- Kehm Corp., The, Chicago, Ill.
- Sarcotherm Controls, Inc., New York, N. Y.

ELECTRIC AIR CLEANERS

See Cleaners, Air, Electrical

ELECTRIC DRILLS

See Drills, Electric, Portable

ELECTRIC MOTORS

See Motors, Electric

ELECTRIC SHEARS

See Shears, Electric, Portable

ELECTRIC UNIT HEATERS

See Heaters, Unit, Electric Heating Element

ELECTRIC WATER HEATERS

See Heaters, Water, Electric

ELECTRODES, ARC WELDING

- Air Reduction Sales Co., New York, N. Y.
- All-State Welding Alloys Co., Inc., White Plains, N. Y.
- Allegheny Ludlum Steel Corp., Pittsburgh, Pa. (Stainless)
- Allied Weld-Craft, Inc., Indianapolis, Ind.
- ● Aluminum Co. of America, Pittsburgh, Pa.
- American Agile Corp., Cleveland, O.
- ● American Brass Co., Waterbury, Conn.
- American Steel & Wire Co., United States Steel Corp. Subsidiary, Cleveland, O.
- Arcos Corp., Philadelphia, Pa.
- Atlantic Steel Co., Atlanta, Ga.
- Carlin Co., Anthony, Cleveland, O.
- Chase Brass & Copper Co., Waterbury, Conn.
- Electric Arc., Inc., Newark, N. J.
- Eutectic Welding Alloys Corp., New York, N. Y.
- General Electric Co., Apparatus Dept., Schenectady, N. Y.
- Harnischfeger Corp., Milwaukee, Wis.
- Hobart Bros. Co., Troy, O.
- International Nickel Co., Inc., The, New York, N. Y.
- Jessop Steel Co., Washington, Pa.
- Laclede Steel Co., St. Louis, Mo.
- Lincoln Electric Co., Cleveland, O.
- Marquette Mfg. Co., Minneapolis, Minn.
- Maurath, Inc., Cleveland, O.
- McKay Co., Pittsburgh, Pa.
- Metal & Thermit Corp., New York, N. Y.
- National Carbon Co., New York, N. Y.
- National Cylinder Gas Co., Chicago, Ill.
- Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
- Sight Feed Generator Co., Richmond, Ind.
- Smith Corp., A. O., Milwaukee, Wis.
- Trindl Products, Ltd., Chicago, Ill.
- Universal Power Corp., Cleveland, O.
- Welding Apparatus Co., Chicago, Ill.

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Westinghouse Electric Corp., Pittsburgh, Pa.
Wilson Welder & Metals Co., Inc., New York, N. Y.

ELIMINATORS, AIR, FOR HEATING AND PIPING SYSTEMS

● Anderson Co., V. D., The, Cleveland, O.
● Armstrong Machine Works, Three Rivers, Mich.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
● Dole Valve Co., The, Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
Lodge & Shipley Machine Tool Co., Cincinnati, O.
● Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Div. of Marsh Corp., Jas. P., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Mouat Vapor Heating Co., The, Cleveland, O.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
● Sterling, Inc., Milwaukee, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Vapor Specialty Co., New York, N. Y.
Wright-Austin Co., Detroit, Mich.

ENAMELS AND LACQUERS

Acme White Lead & Color Works, Detroit, Mich.
Acorn Refining Co., Cleveland, O.
American-Marietta Co., Chicago, Ill.
Arco Co., Cleveland, O.
Baer Bros., New York, N. Y.
Blue Ridge Talc Co., Inc., Henry, Va.
Claronex Products, Inc., Brooklyn, N. Y.
Cordo Chemical Co., Norwalk, Conn.
Debevoise Co., The, Brooklyn, N. Y.
Devoe & Raynolds Co., Inc., New York, N. Y.
du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.
Hague & Co., Alfred, Brooklyn, N. Y.
Hilo Varnish Corp., Brooklyn, N. Y.
Inter-Coastal Paint Corp., East St. Louis, Ill.
Interchemical Corp., Finishes Div., Newark, N. J.
Irvington Varnish and Insulator Co., Irvington, N. J.
Knight, Maurice A., Akron, O.
Koppers Co., Inc., Tar Products Div., Pittsburgh, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Maas & Waldstein Co., Newark, N. J.
Midwest Products Co., Port Byron, Ill.
O'Brien Corp., The, South Bend, Ind.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Quigley Co., Inc., New York, N. Y.
Sherwin-Williams Co., The, Cleveland, O.
Sipe & Co., James B., Pittsburgh, Pa.
Sonneborn Sons, Inc., L., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Thompson & Co., Oakmont, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit, Mich.
U. S. Gutta Percha Paint Co., Providence, R. I.
United Chromium, Inc., New York, N. Y.
Wattenamel Co., Summit, Ill.
Wilbur & Williams Co., Boston, Mass.
Wilhelm Co., A., Reading, Pa.
Zapon Div., Atlas Powder Co., North Chicago, Ill.

ENCLOSURES, CONVECTOR

American Coils Co., Newark, N. J.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
National Radiator Co., The, Johnstown, Pa.

ENGINES, DIESEL, FOR FAN, PUMP AND COMPRESSOR DRIVES

American Locomotive Co., Auburn, N. Y.
Anderson Diesel Engine Co., Philadelphia, Pa.
Baldwin De La Vergne Sales Corp., Philadelphia, Pa.
Buda Co., Harvey, Ill.
Caterpillar Tractor Co., Peoria, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Continental Motors Corp., Muskegon, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Detroit Diesel Engine Div., General Motors Corp., Detroit, Mich.
Fairbanks, Morse & Co., Chicago, Ill.
Hill Diesel Engine Div. of Indian Motocycle Co., Lansing, Mich.
● Ingersoll-Rand Co., New York, N. Y.
Waukesha Motor Co., Waukesha, Wis.
Witte Engine Works, Div. of Oil Well Supply Co., Kansas City, Mo.
● Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES, GAS, FOR FAN, PUMP AND COMPRESSOR DRIVES

Buda Co., Harvey, Ill.
Caterpillar Tractor Co., Peoria, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Continental Motors Corp., Detroit, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Fairbanks, Morse & Co., Chicago, Ill.
● Ingersoll-Rand Co., New York, N. Y.
Salsbury Motors, Inc., Pomona, Calif.
Waukesha Motor Co., Waukesha, Wis.
Witte Engine Works, Div. of Oil Well Supply Co., Kansas City, Mo.
● Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES, STEAM, FOR FAN, PUMP AND COMPRESSOR DRIVES

Ames Iron Wks., Div, of Pierce, Butler Radiator Corp., Oswego, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Harrisburg Machinery Corp., Harrisburg, Pa.
Skinner Engine Co., Erie, Pa.
Troy Engine & Machine Co., Troy, Pa.
Vilter Mfg. Co., Milwaukee, Wis.

EQUIPMENT, BALANCING

● Bear Mfg. Co., Industrial Div., Rock Island, Ill.
Gisholt Machine Co., Madison, Wis.
Ideal Industries, Inc., Sycamore, Ill.
Olsen Testing Machine Co., Tinius, Philadelphia, Pa.

EVAPORATIVE CONDENSERS

See Condensers, Refrigerating, Evaporative

EXCHANGERS, HEAT

● Aluminum Co. of America, Pittsburgh, Pa.
American Coils Co., Newark, N. J.
● American District Steam Co., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
● Babcock & Wilcox Co., New York, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Buffalo Tank Corp., Dunellen, N. J.
● Bush Mfg. Co., Hartford, Conn.
Champion Unit Heater Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Foster Wheeler Corp., New York, N. Y.
Goodyer Industries, Inc., Chicago, Ill.
Graham Mfg. Co., Inc., New York, N. Y.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Griscom-Russell Co., The, New York, N. Y.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Kellogg Co., M. W., The, New York, N. Y.
Kold-Hold Mfg. Co., Lansing, Mich.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
● McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
Minimite Co., Chicago, Ill.
● Modine Mfg. Co., Racine, Wis.
Mueller Brass Co., Port Huron, Mich.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Carbon Co., New York, N. Y.
National Pipe Bending Co., New Haven, Conn.
National Radiator Co., The, Johnstown, Pa.
Nooter Boiler Works Co., John, St. Louis, Mo.
Parker Appliance Co., The, Cleveland, O.
● Patterson-Kelley Co., Inc., East Stroudsburg, Pa.
Peerless of America, Inc., Chicago, Ill.
Perfex Corp., Milwaukee, Wis.
Phillips Cooling Tower Co., Inc., New York, N. Y.
Prat-Daniel Corp., Port Chester, N. Y.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Quaker City Iron Works, Philadelphia, Pa.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
● Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Schuette & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Smith Corp., A. O., Milwaukee, Wis.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Stout & Sons, David, St. Louis, Mo.
Superior Valve & Fittings Co., Pittsburgh, Pa.

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Thermal Industries, Indio, Calif.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vapor Car Heating Co., Inc., Chicago, Ill.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whitlock Mfg. Co., Hartford, Conn.
Wilson Engineering Corp., Chicago, Ill.
Winslow Engineering Co., Oakland, Calif.
● Worthington Pump & Machinery Corp., Harrison, N. J.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

EXCHANGERS, HEAT, REFRIGERANT SUCTION LINE

● Acme Industries, Inc., Jackson, Mich.
American Coils Co., Newark, N. J.
Betz Corp, Hammond, Ind.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Gerstein & Cooper Co., South Boston, Mass.
Governair Corp., Oklahoma City, Okla.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Kaiser Co., E. B., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
MagniLastic Div., Cook Electric Co., Chicago, Ill.
● Marlo Coil Co., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Remco, Inc., Zelienople, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Temprite Products Corp., Detroit, Mich.
Wabash Mfg. Co., Chicago, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Young Radiator Co., Racine, Wis.

EXHAUST HEADS

See Heads, Exhaust, for Pipe Lines

EXHAUSTERS, WELDING FUME

Aladdin Heating Corp., Oakland, Calif.
American Blower Corp., Detroit, Mich.
American Machine Products Co., Marshalltown, Ia.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Coppus Engineering Corp., Worcester, Mass.
Dana Fan & Blower Corp., Cincinnati, O.
Day Co., The, Minneapolis, Minn.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
General Blower Co., Morton Grove, Ill.
Jenn Air Products Co., Indianapolis, Ind.
Kirk & Blum Mfg. Co., Cincinnati, O.
Master Fan Corp., Los Angeles, Calif.
Peters-Dalton, Inc., Detroit, Mich.
Power Engineering Co., Chicago, Ill.
Propellair, Inc., Springfield, O.
Ruemelin Mfg. Co., Milwaukee, Wis.
Torit Mfg. Co., St. Paul, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Whiting Corp., Harvey, Ill.
Wind-Way Fan & Ventilator Co., New Orleans, La.

EXPANDERS, BOILER TUBE

Dudgeon, Inc., Richard, New York, N. Y.

EXPANSION BENDS

See Bends, Expansion

EXPANSION BOLTS

See Bolts, Expansion

EXPANSION JOINTS

See Joints, Pipe, Expansion

EXPANSION TANKS

See Tanks, Expansion, for Hot Water Heating Systems

EXPANSION VALVES

See Valves, Refrigeration

EXTRACTORS, PIPE

Reps Tool Co., Inc., Hartford Conn.
● Ridge Tool Co., Elyria, O.

FABRICATED PIPING

See Bends; Headers; Joints, etc.

FABRICATORS, PIPE

See Headers, Welded; and Coils, Pipe

FAN BALANCING EQUIPMENT

See Equipment, Balancing

FAN BASES

See Bases and Pads, Vibration Isolating

FAN BLADES

See Blades, Propeller Fan

FAN HOUSINGS

See Housings, Fan, Centrifugal

FANS, AXIAL FLOW, PRESSURE TYPE

Aerovent Fan Co., Piqua, O. (Tubeaxial)
American Blower Corp., Detroit, Mich.
● Buffalo Forge Co., Buffalo, N. Y.
Buffalo Turbine Corp., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Circulators & Devices Mfg. Corp., New York, N. Y. (vaneaxial)
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Hartzell Propeller Fan Co., Piqua, O.
● Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering Inc., Dayton, O.
● Joy Mfg. Co., Pittsburgh, Pa. (vaneaxial)
● Moore Co., The, Kansas City, Mo. (vaneaxial)
Power Engineering Co., Chicago, Ill.
Propellair, Inc., Springfield, O.
● South Bend Air Products, Inc., South Bend, Ind.
● Westinghouse Electric Corp., Pittsburgh, Pa.
● Wing Mfg. Co., L. J., New York, N. Y.

FANS, CENTRIFUGAL

Advance Aluminum Castings Corp., Chicago, Ill.
Advance Fan & Blower Co., Detroit, Mich.
Air Controls, Inc., Cleveland, O.
Aladdin Heating Corp., Oakland, Calif.
Allington & Curtis Mfg. Co., Saginaw, Mich.
American Blower Corp., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Machine Products Co., Marshalltown, Ia.
Ballantyne Co., Omaha, Neb.
Bayley Blower Co., Milwaukee, Wis.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Bern's Specialty Mfg. Co., Chicago, Ill.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
Brundage Co., The, Kalamazoo, Mich.
● Buffalo Forge Co., Buffalo, N. Y.
● Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.
● Carrier Corp., Syracuse, N. Y.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Circulators & Devices Mfg. Corp., New York, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.
Day Co., The, Minneapolis, Minn.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Despatch Oven Co., Minneapolis, Minn.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Eastern Air Devices, Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Essick Mfg. Co., Los Angeles, Calif.
Garden City Fan Co., Chicago. Ill.
General Blower Co., Inc., Philadelphia, Pa.
General Blower Co., Morton Grove, Ill.
Goettl Bros. Metal Products Co., Phoenix, Ariz.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Green Fuel Economizer Co., Beacon, N. Y.
● Hastings Air Conditioning Co., Hastings, Neb.
● Ilg Electric Ventilating Co., Chicago, Ill.
Indiana Fan Company, Indianapolis, Ind.
International Sales Co., San Francisco, Calif.
● Jackson & Church Co., Saginaw, Mich.
Jaden Mfg. Co., Hastings, Neb.
Jeffrey Mfg. Co., Columbus, O.
Jenn Air Products Co., Indianapolis, Ind.
Johnson Fan & Blower Corp., Chicago, Ill.
King Co., The, Owatonna, Minn.
Lau Blower Co., Dayton, O.
Lehigh Fan & Blower Co., Allentown, Pa.
Lienweber Propellers, Chicago, Ill.

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Magirl Foundry & Furnace Co., Bloomington, Ill.
Martin Fan & Blower Co., Chicago, Ill.
Montag Stove & Furnace Wks., Portland, Ore.
Morrison Products, Inc., Cleveland, O.
Motionair Co., Los Angeles, Calif.
Mountain States Equipment Co., Denver, Colo.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Engineering & Mfg. Co., Kansas City, Mo.
National Mfg. & Engineering Co., Detroit, Mich.
● Nelson Corp., Herman, Moline, Ill.
New York Blower Co., Chicago, Ill.
Newcomb Engineering Co., Grand Rapids, Mich.
Niagara Blower Co., New York, N. Y.
Northern Blower Co., Cleveland, O.
Northwest Foundry & Furnace Co., Portland, Ore.
Palmer Mfg. Co., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
Phelps Mfg. Co., Little Rock, Ark.
Power Engineering Co., Chicago, Ill.
Prat-Daniel Corp., Port Chester, N. Y.
Production Planning Co., Rochester, Mich.
Reynolds Mfg. Co., The, Grand Rapids, Mich.
Redmond Co., Inc., Owosso, Mich.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Schwitzer-Cummins Co., Indianapolis, Ind.
Semco Mfg. Co., Nashville, Tenn.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
● Westinghouse Electric Corp., Pittsburgh, Pa.
● Wing Mfg. Co., L. J., New York, N. Y.

FANS, PROPELLER

Aerovent Fan Co., Piqua, O.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Air Equipment Co., Chicago, Ill.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
American Metal Products Co., Fort Worth, Tex.
Arex Co., Chicago, Ill.
Bar-Brook Mfg. Co., Inc., Shreveport, La.
Bayley Blower Co., Milwaukee, Wis.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Bern's Specialty Mfg. Co., Chicago, Ill.
Binks Mfg. Co., Chicago, Ill.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Bronson Fan Mfg. Co., Los Angeles, Calif.
● Buffalo Forge Co., Buffalo, N. Y.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Campbell Heating Co., E. K., Kansas City, Mo.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Circulators & Devices Mfg. Corp., New York, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.
Dana Fan & Blower Corp., Cincinnati, O.
De Bothezat Fans Div., American Machine & Metals, Inc., New York, N. Y.
DeVilbiss Co., The, Toledo, O.
Diehl Mfg. Co., Somerville, N. J.
Dual Air Fan Co., Chicago, Ill.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fresh'nd-Aire Co., Div. of Cory Corp., Chicago, Ill.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Inc., Philadelphia, Pa.
General Blower Co., Morton Grove, Ill.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Guth Co., Edwin F., St. Louis, Mo.
Hartzell Propeller Fan Co., Piqua, O.
Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Holtum Mfg. Co., Freeport, Ill.
Howry-Berg Steel & Iron Works, Denver, Colo.
Hunter Fan & Ventilating Co., Inc., Memphis, Tenn.
● Ilg Electric Ventilating Co., Chicago, Ill.
Indiana Fan Co., Indianapolis, Ind.
International Engineering, Inc., Dayton, O.
Jamieson Mfg. Co., Dallas, Tex.
Jeffrey Mfg. Co., Columbus, O.
Johnson Fan & Blower Corp., Chicago, Ill.
Jordan & Co., Paul R., Indianapolis, Ind.
● Joy Mfg. Co., Pittsburgh, Pa.
Kernchen Co., Chicago, Ill.
King Co., The, Owatonna, Minn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lau Blower Co., Dayton, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Martin Fan & Blower Co., Chicago, Ill.
● McCord Corp., Detroit, Mich.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
● Moore Co., The, Kansas City, Mo.
Motionair Co., Los Angeles, Calif.
Mountain States Equipment Co., Denver, Colo.
Myers Electric Co., Inc., Pittsburgh, Pa.
National Engineering & Mfg. Co., Kansas City, Mo.
National Gas Equipment Co., Inc., Terrell, Tex.
● Nelson Corp., Herman, Moline, Ill.
New York Blower Co., Chicago, Ill.
Newcomb Engineering Co., Grand Rapids, Mich.
Peerless Electric Co., Warren, O. (Disc)
Perkins & Son, Inc., B. F., Holyoke, Mass.
Phelps Mfg. Co., Little Rock, Ark.
● Pritchard & Co., J. F., Kansas City, Mo.
Production Planning Co., Rochester, Mich.
Propellair, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Reynolds Electric Co., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
Semco Mfg. Co., Nashville, Tenn.
Sensenich Corp., Lancaster, Pa.
Signal Electric Mfg. Co., Menominee, Mich.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Smith Mfg. Co., F. A., Rochester, N. Y.
Somers, Inc., H. J., Detroit, Mich.
● South Bend Air Products, Inc., South Bend, Ind.
Standard Electric Mfg. Co., West Berlin, N. J.
Sutton Corp., O. A., Wichita, Kan.
Swift Mfg. Co., Inc., Detroit, Mich.
Thermal Industries, Indio, Calif.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
● Trane Co., The, LaCrosse, Wis.
Truflo Fan Co., Harmony, Pa.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Victor Electric Products, Inc., Cincinnati, O.
Viking Air Conditioning Corp., Cleveland, O.
Water Cooling Equipment Corp., St. Louis, Mo.
Western Blower Co., Seattle, Wash.
Western Engineering & Mfg. Co., Los Angeles, Calif.
● Westinghouse Electric Corp., Pittsburgh, Pa.
Wind-Way Fan & Ventilating Co., New Orleans, La.
● Wing Mfg. Co., L. J., New York, N. Y.

FEEDERS, CHEMICAL, PROPORTIONING

American Water Softener Co., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Elgin Softener Corp., Elgin, Ill.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Haering & Co., Inc., D. W., Chicago, Ill.
Jeffrey Mfg. Co., Columbus, O.
National Aluminate Corp., Chicago, Ill.
%Proportioneers, Inc. %, Providence, R. I.
Permutit Co., New York, N. Y.
Roy Co., Milton, Philadelphia, Pa.
Sprout, Waldron & Co., Muncy, Pa.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Syntron Co., Homer City, Pa.
Wallace & Tiernan Co., Inc., Newark, N. J.

FEEDERS, WATER, HEATING BOILER

Bailey Co., Chas. M., San Francisco, Calif.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
● General Controls Co., Glendale, Cal.
Jacuzzi Bros., Inc., Richmond, Calif.
● Johnson Corp., The, Three Rivers, Mich.
● Kieley & Mueller, Inc., North Bergen, N. J.
Kisco Boiler & Engineering Co., St. Louis, Mo.
● Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nason Co., Detroit, Mich.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
● Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.

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- Templeton Mfg. Co., Hyde Park, Mass.
- Watts Regulator Co., Lawrence, Mass.
- ● Webster & Co., Warren, Camden, N. J.

FEEDWATER HEATERS

See Deaerators

FIBER PACKING

See Packing, Fiber

FIBER PIPE

See Pipe, Fiber

FILTER GAGES

See Gages, Air Filter

FILTERS, AIR, AUTOMATIC

- ● Air & Refrigeration Corp., New York, N. Y.
- Air-Stream Filter Corp., St. Louis, Mo.
- ● American Air Filter Co., Inc., Louisville, Ky.
- Brauer Supply Co., A. G., St. Louis, Mo.
- Continental Air Filters, Inc., Louisville, Ky.
- ● Dollinger Corp., Rochester, N. Y.
- Farr Co., Los Angeles, Calif.
- Ruemelin Mfg. Co., Milwaukee, Wis.
- Trion, Inc., McKees Rocks, Pa.

FILTERS, AIR, GREASE

- ● Air Filter Corp., Milwaukee, Wis.
- Air-Maze Corp., Cleveland, O.
- ● American Air Filter Co., Inc., Louisville, Ky.
- Continental Air Filters, Inc., Louisville, Ky.
- Farr Co., Los Angeles, Calif.
- Research Products Corp., Madison, Wis.

FILTERS, AIR, UNIT, CLEANABLE

- ● Air Devices, Inc., New York, N. Y.
- ● Air Filter Corp., Milwaukee, Wis.
- Air-Maze Corp., Cleveland, O.
- Air-Stream Filter Corp., St. Louis, Mo.
- ● American Air Filter Co., Inc., Louisville, Ky.
- Annis Air Filters, Glendale, Calif.
- Brauer Supply Co., A. G., St. Louis, Mo.
- Chicago Filter Co., Joliet, Ill.
- Continental Air Filters, Inc., Louisville, Ky.
- Coppus Engineering Corp., Worcester, Mass.
- ● Dollinger Corp., Rochester, N. Y.
- Drico Industrial Corp., New York, N. Y.
- Farr Co., Los Angeles, Calif.
- Kauffman Air Conditioning Corp., St. Louis, Mo.
- Kaye & MacDonald, Inc., West Orange, N. J.
- Morf Industries, Inc., Staten Island, N. Y.
- Research Products Corp., Madison, Wis.
- Somers, Inc., H. J., Detroit, Mich.
- Supreme Air Filter Co., New York, N. Y.
- Trion, Inc., McKees Rocks, Pa.
- Universal Air Filter Corp., Duluth, Minn.

FILTERS, AIR, UNIT, THROW-AWAY

- ● American Air Filter Co., Inc., Louisville, Ky.
- Andale Co., Philadelphia, Pa.
- Blocksom & Co., Michigan City, Ind.
- Chicago Filter Co., Joliet, Ill.
- Drico Industrial Corp., New York, N. Y.
- General Filters, Inc., Detroit, Mich. (For fuel oil)
- Morf Industries, Inc., Staten Island, N. Y.
- ● Owens-Corning Fiberglas Corp., Toledo, O.
- Research Products Corp., Madison, Wis.
- Universal Air Filter Corp., Duluth, Minn.
- ● Wilson & Co., Inc., Chicago, Ill.

FILTERS, ODOR

See Adsorbers, Odor

FILTERS, PIPE LINE

- Adams Co., Inc., R. P., Buffalo, N. Y.
- Air-Maze Corp., Cleveland, O.
- ● Alco Valve Co., St. Louis, Mo.
- ● American Air Filter Co., Inc., Louisville, Ky.
- American Cyanamid & Chemical Corp., New York, N. Y.
- American Locomotive Co., Alco Products Div., New York, N. Y.
- Annis Air Filters, Glendale, Calif.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Bowser, Inc., Fort Wayne, Ind.
- Cleveland Humidifier Co., Cleveland, O.
- Commercial Filters Corp., Boston, Mass.
- Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Cuno Engineering Corp., Meriden, Conn.
- DeVilbiss Co., The, Toledo, O.
- ● Dollinger Corp., Rochester, N. Y.
- Drico Industrial Corp., New York, N. Y.
- Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
- ● Fisher Governor Co., Marshalltown, Ia.
- Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
- Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
- Hotstream Heater Co., Cleveland, O. (air)
- ● Johnson Corp., The, Three Rivers, Mich.
- Kraissl Co., Inc., The, Hackensack, N. J.
- Logan Engineering Co., Chicago, Ill.
- Mason-Neilan Regulator Co., Boston, Mass.
- Moraine Products Div., General Motors Corp., Dayton, O. (Porous metal)
- Morse-Smith-Morse, Inc., Watertown, Mass.
- Newark Wire Cloth Co., Newark, N. J.
- Norgren Co., C. A., Denver, Colo.
- Patrol Valve Co., The Cleveland, O.
- Permutit Co., New York, N. Y.
- Refinite Corp., Omaha, Neb.
- Rega Mfg. Co., Rochester, N. Y.
- Rodwell Engineering & Sales Co., Omaha, Neb.
- Ross Valve Mfg. Co., Inc., Troy, N. Y.
- Scientific Instrument Co., Detroit, Mich.
- Standard Machine & Mfg. Co., St. Louis, Mo.
- Trerice Co., Detroit, Mich.
- Weatherhead Co., Cleveland, O.
- Winslow Engineering Co., Oakland, Calif.
- ● Worthington Pump & Machinery Corp., Harrison, N. J.

FILTERS, REFRIGERANT

- ● Alco Valve Co., St. Louis, Mo.
- ● Automatic Products Co., Milwaukee, Wis.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Commercial Filters Corp., Boston, Mass.
- Drico Industrial Corp., New York, N. Y.
- ● Henry Valve Co., Chicago, Ill.
- Imperial Brass Mfg. Co., Chicago, Ill.
- McIntire Connector Co., Newark, N. J.
- Moraine Products Div., General Motors Corp., Dayton, O. (Porous metal)
- Mueller Brass Co., Port Huron, Mich.
- Newark Wire Cloth Co., Newark, N. J.
- Phillips & Co., H. A., Chicago, Ill.
- Remco, Inc., Zelienople, Pa.
- ● Sporlan Valve Co., St. Louis, Mo.
- Standard Machine & Mfg. Co., St. Louis, Mo.
- Wabash Mfg. Co., Chicago, Ill.
- Weatherhead Co., Cleveland, O.

FILTERS, WATER

- Adams Co., Inc., R. P., Buffalo, N. Y.
- ● Alco Valve Co., St. Louis, Mo.
- American Cyanamid & Chemical Corp., New York, N. Y.
- American Water Softener Co., Philadelphia, Pa.
- American Well Works, Aurora, Ill.
- Aqua-Mist Co., Topeka, Kan. (Aspenwood fibre)
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Bowser, Inc., Fort Wayne, Ind.
- Cochrane Corp., Philadelphia, Pa.
- Commercial Filters Corp., Boston, Mass.
- Condenser Service & Engineering Co., Inc., Hoboken, N. J.
- Cuno Engineering Corp., Meriden, Conn.
- ● Dollinger Corp., Rochester, N. Y.
- Drico Industrial Corp., New York, N. Y.
- Elgin Softener Corp., Elgin, Ill.
- Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
- Greer Hydraulics, Inc., Brooklyn, N. Y.
- Liquid Conditioning Corp., Linden, N. J.
- Newark Wire Cloth Co., Newark, N. J.
- % Proportioneers, Inc. %, Providence, R. I.
- Permutit Co., New York, N. Y.
- Red Jacket Mfg. Co., Davenport, Ia.
- Refinite Corp., Omaha, Neb.
- Valley Foundry & Machine Works, Inc., Fresno, Calif.
- Winslow Engineering Co., Oakland, Calif.
- ● Worthington Pump & Machinery Corp., Harrison, N. J.

FINNED TUBING

See Tubing, Finned

FIRE PUMPS

See Pumps, Fire

FITTINGS, BLOW PIPE

- Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- Allington & Curtis Mfg. Co., Saginaw, Mich.
- Chicago Metal Mfg. Co., Chicago, Ill.
- Day Co., The, Minneapolis, Minn.
- Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.

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Gustin Bacon Mfg. Co., Kansas City, Mo.
Kirk & Blum Mfg. Co., Cincinnati, O.
Mahon Co., R. C., Detroit, Mich.
National Metal Fabricators, Chicago, Ill.
Newcomb Engineering Co., Grand Rapids, Mich.
Northern Blower Co., Cleveland, O.
Peters-Dalton, Inc., Detroit, Mich.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Schmieg Inudustries, Detroit, Mich.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Tiffin Eaves Trough Clamp Co., Tiffin, O.
United States Register Co., Battle Creek, Mich.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Pittsburgh, Pa.
Winkler & Sons, Inc., A. E. Milwaukee, Wis.
Young & Bertke Co., Cincinnati, O.

FITTINGS, COPPER TUBE, COMPRESSION

● American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
● Dole Valve Co., The, Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Everhot Products Co., Chicago, Ill.
● Grinnell Co., Inc., Providence, R. I.
Hays Mfg. Co., Erie, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
● Kerotest Mfg. Co., Pittsburgh, Pa.
Parker Appliance Co., The, Cleveland, O.
Petroleum Equipment Mfg. Co., New Haven, Conn.
Wabash Mfg. Co., Chicago, Ill.
Weatherhead Co., Cleveland, O.

FITTINGS, COPPER TUBE, FLARED

● American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Brockway Co., Naugatuck, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
● Dole Valve Co., The, Chicago, Ill.
Everhot Products Co., Chicago, Ill.
● Grinnell Co., Inc., Providence, R. I.
Hays Mfg. Co., Erie, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Packless Metal Products Corp., New Rochelle, N. Y.
Parker Appliance Co., The, Cleveland, O.
Petroleum Equipment Mfg. Co., New Haven, Conn.
Phoenix Brass Fittings Corp., Irvington, N. J.
Weatherhead Co., Cleveland, O.

FITTINGS, COPPER TUBE, SOLDER

Acheson Mfg. Co., Rankin, Pa.
● American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
● Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grabler Mfg. Co., Cleveland, O.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Petroleum Equipment Mfg. Co., New Haven, Conn.
Phoenix Brass Fittings Corp., Irvington, N. J.
Union Metal Works, Chelsea, Mass.
● Walworth Co., New York, N. Y. (Brazed)

FITTINGS, DRAINAGE, FIXED AIR BREAK

American Sterilizer Co., Erie, Pa.
● Crane Co., Chicago, Ill.
Scanlan-Morris Co., Madison, Wis.
Semler Co., Jeannette, Pa.

FITTINGS, HOT WATER HEATING SYSTEMS, ONE PIPE

● Bell & Gossett Co., Morton Grove, Ill.
Kehm Corp., The, Chicago, Ill.
Sall Bros. Co., Rockford, Ill.
Semler Co., Jeannette, Pa.
● Taco Heaters, Inc., New York, N. Y.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
● Tube Turns, Inc., Louisville, Ky.
W-H Engineering Co., Chicago, Ill.

FITTINGS, LINED

American Hard Rubber Co., New York, N. Y. (Rubber)
Cement Lined Pipe Co., Lynn, Mass. (Lead and tin)
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Gates Engineering Co., Wilmington, Del.
Goodrich Co., B. F., Akron, O. (Rubber)
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin)
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Michigan Pipe Co., Bay City, Mich. (Wood)
National Lead Co., New York, N. Y. (Lead)
Northern Indiana Brass Co., Elkhart, Ind. (Tinned)
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass.
United States Rubber Co., New York, N. Y. (Rubber)
Warren Foundry & Pipe Corp., New York, N. Y.

FITTINGS, PIPE, BRASS, THREADED

Acheson Mfg. Co., Rankin, Pa.
American Manganese Bronze Co., Philadelphia, Pa.
Belfield Co., H., Philadelphia, Pa.
Bowser, Inc., Fort Wayne, Ind.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
● Crane Co., Chicago, Ill.
● Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Kennedy Valve Mfg. Co., Elmira, N. Y.
Leavitt Machine Co., Orange, Mass.
● Lunkenheimer Co., Cincinnati, O.
New York Brass Fdry., New York, N. Y.
Parker Appliance Co., Cleveland, O.
Penn Mfg. Corp., of Washington, Pa., Washington, Pa.
Phoenix Brass Fittings Corp., Irvington, N. J.
Ross Sprinkler Co., Pasadena, Calif.
Union Metal Wks., Chelsea, Mass.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS, PIPE, BRASS, WELDING

● Bonney Forge & Tool Wks., Allentown, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y. (Brazed)

FITTINGS, PIPE, BRONZE, BRAZED

Chase Brass & Copper Co., Waterbury, Conn.
Fairbanks Co., New York, N. Y.
● Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Kaltenthaler Co., H. J., Philadelphia, Pa.
Union Metal Works, Chelsea, Mass.
● Walworth Co., New York, N. Y.

FITTINGS, PIPE, BRONZE, SOLDER

Acheson Mfg. Co., Rankin, Pa.
● American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Everhot Products Co., Chicago, Ill.
● Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Keeney Mfg. Co., Newington, Conn.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Parker Appliance Co., Cleveland, O.
Union Metal Works, Chelsea, Mass.

FITTINGS, PIPE, CAST IRON, FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Eastern Foundry Co., Boyertown, Pa.
● Frick Co., Waynesboro, Pa.
● Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
Kaltenthaler Co., H. J., Philadelphia, Pa.
● Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kuhns Bros. Co., Dayton, O.
Lynchburg Foundry Co., Lynchburg, Va.
Malleable Iron Fittings Co., Branford, Conn.

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National Valve & Mfg. Co., Pittsburgh, Pa.
● Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semler Co., Jeannette, Pa.
Stockham Pipe Fittings Co., Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.
United States Pipe & Foundry Co., Burlington, N. J.
● Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.

FITTINGS, PIPE, CAST IRON, THREADED

Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Eastern Foundry Co., Boyertown, Pa.
● Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kuhns Bros. Co., Dayton, O.
Malleable Iron Fittings Co., Branford, Conn.
Ravena Iron Co., Ravena, N. Y.
Semler Co., Jeannette, Pa.
Somerville Iron Works, Somerville, N. J.
Stockham Pipe Fittings Co., Birmingham, Ala.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS, PIPE, COMPRESSION

Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Hays Mfg. Co., Erie, Pa.
Patrol Valve Co., The, Cleveland, O.

FITTINGS, PIPE, HARD RUBBER

American Hard Rubber Co., New York, N. Y.
Goodrich Co., B. F., Akron, O.
Luzerne Rubber Co., Trenton, N. J.
Raybestos-Manhattan, Inc., Passaic, N. J.
Stokes Molded Products, Trenton, N. J.
United States Rubber Co., New York, N. Y.

FITTINGS, PIPE, LEAD

Alpha Metals, Inc., Brooklyn, N. Y.
Patrol Valve Co., The, Cleveland, O.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Works, Inc., Rochester, N. Y.

FITTINGS, PIPE, MALLEABLE

Corley Co., Inc., The, Jersey City, N. J.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
● Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Kennedy Valve Mfg. Co., Elmira, N. Y.
Malleable Iron Fittings Co., Branford, Conn.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Rhode Island Fittings Co., Hillsgrove, R. I.
Stockham Pipe Fittings Co., Birmingham, Ala.
Victaulic Co. of America, New York, N. Y.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS, PIPE, NICKEL AND NICKEL ALLOY

Alloy Steel Products Co., Linden, N. J.
American Manganese Bronze Co., Philadelphia, Pa.
Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Hasco Valve & Machine Co., Milwaukee, Wis.
International Nickel Co., New York, N. Y.
● Ladish Co., Cudahy, Wis.
● Tube Turns, Inc., Louisville, Ky.
● Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.

FITTINGS, PIPE, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
Amerform Corp., Philadelphia, Pa.
American Hard Rubber Co., New York, N. Y.
Commercial Plastics Co., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Mills Corp., Elmer E., Chicago, Ill.
North Penn Co., New York, N. Y.
Parker Appliance Co., The, Cleveland, O.
United States Stoneware Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

FITTINGS, PIPE, STAINLESS STEEL

Alloy Steel Products Co., Linden, N. J.
Colonial Alloys Co., Metals, Div., Philadelphia, Pa.
Cooper Alloy Foundry Co., Hillside, N. J.
Flori Pipe Co., The, St. Louis, Mo.
Hasco Valve & Machine Co., Milwaukee, Wis.
Northern Indiana Brass Co., Elkhart, Ind.
● Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
● Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
● Tube Turns, Inc., Louisville, Ky.

FITTINGS, PIPE, STEEL, FLANGED

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Hamer Oil Tool Co., Long Beach, Calif.
Kerotest Mfg. Co., Pittsburgh, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Semet-Solvay Engrg. Corp., New York, N. Y.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, FORGED, THREADED

● Bonney Forge & Tool Works, Allentown, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
● Henry Valve Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
● Ladish Co., Cudahy, Wis.
Larkin Packer Co., St. Louis, Mo.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, SOCKET WELD

● Bonney Forge & Tool Works, Allentown, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
● Ladish Co., Cudahy, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.

FITTINGS, PIPE, STEEL, THREADED

Catawissa Valve & Fittings Co., Catawissa, Pa.
Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
● Ladish Co., Cudahy, Wis.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Tubing Seal-Cap, Inc., Los Angeles, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.
Wedge Protectors, Inc., Cleveland, O.

FITTINGS, PIPE, STEEL, WELDING

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
● Bonney Forge & Tool Wks., Allentown, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
● Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.

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Flori Pipe Co., The, St. Louis, Mo.
• Globe Steel Tubes Co., Milwaukee, Wis.
• Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
• Ladish Co., Cudahy, Wis.
Larkin Packer Co., St. Louis, Mo.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Oil Well Supply Co., Oil City, Pa.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
• Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
• Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
• Tube Turns, Inc., Louisville, Ky.
Vogt Machine Co., Henry, Louisville, Ky.
• Walworth Co., New York, N. Y.
• Watson-Stillman Co., Roselle, N. J.
Wedge Protectors, Inc., Cleveland, O. (Chill rings)

FITTINGS, PIPE, WROUGHT IRON, WELDING

• Bonney Forge & Tool Wks., Allentown, Pa.
Flori Pipe Co., The, St. Louis, Mo.
• Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
• Taylor Forge & Pipe Wks., Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.
• Walworth Co., New York, N. Y.

FITTINGS, REFRIGERATION

Aeroquip Corp., Jackson, Mich.
American Injector Co., Detroit, Mich.
Baker Ice Machine Co., Inc., South Windham, Me.
Byers Co., A. M., Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
• Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Electrimatic, Chicago, Ill.
• Frick Co., Waynesboro, Pa.
Hays Mfg. Co., Erie, Pa.
• Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
• Ladish Co., Cudahy, Wis.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
• Watson-Stillman Co., Roselle, N. J.
Weatherhead Co., Cleveland, O.
Wittenmeier Machinery Co., Chicago, Ill.
• Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Inc., Chicago, Ill.
• York Corp., York, Pa.

FITTINGS, STEEL TUBE, FLARED

• Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.

FLAME CONTROLS

See Controls, Flame Failure

FLANGE BOLTS

See Bolts and Studs, Flange

FLANGES, ORIFICE

Barton Instrument Co., Los Angeles, Calif.
• Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Conoflow Corp., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
• Ladish Co., Cudahy, Wis.
Meriam Instrument Co., The, Cleveland, O.
• Phoenix Mfg. Co., Joliet, Ill.
Trimount Instrument Co., Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.
• Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, LAP JOINT

Cooper Alloy Foundry Co., Hillside, N. J.
• Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
• Ladish Co., Cudahy, Wis.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
• Phoenix Mfg. Co., Joliet, Ill.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
• Taylor Forge & Pipe Works, Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.
• Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, SCREWED

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., Hillside, N. J.
• Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
• Ladish Co., Cudahy, Wis.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
• Phoenix Mfg. Co., Joliet, Ill.
• Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
• Taylor Forge & Pipe Works, Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.
• Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, WELDING

Cooper Alloy Foundry Co., Hillside, N. J.
• Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
• Ladish Co., Cudahy, Wis.
MagniLastic Div., Cook Electric Co., Chicago, Ill.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennslvania Forge Co., Philadelphia, Pa.
• Phoenix Mfg. Co., Joliet, Ill.
• Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
• Taylor Forge & Pipe Works, Chicago, Ill.
• Tube Turns, Inc., Louisville, Ky.
• Walworth Co., New York, N. Y.

FLANGES, PIPE, BRASS, SCREWED

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Conoflow Corp., Philadelphia, Pa.
• Crane Co., Chicago, Ill.
• Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
• Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
Kaltenthaler Co., H. J., Philadelphia, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Union Metal Works, Chelsea, Mass.
• Walworth Co., New York, N. Y.

FLANGES, PIPE, CAST IRON, SCREWED

Clow & Sons, James B., Chicago, Ill.
• Crane Co., Chicago, Ill.
• Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
• Grinnell Co., Inc., Providence, R. I.
Jarecki Mfg. Co., Erie, Pa.
Kaltenthaler Co., H. J., Philadelphia, Pa.
• Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kuhns Bros. Co., Dayton, O.
Lynchburg Foundry Co., Lynchburg, Va.
National Valve & Mfg. Co., Pittsburgh, Pa.
• Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
Ravena Iron Co., Ravena, N. Y.
Semler Co., Jeannette, Pa.
Stockham Pipe Fittings Co., Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., Syracuse, N. Y.
• Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P. Blossburgh, Pa.
Warren Foundry & Pipe Corp., New York, N. Y.

FLANGES, PIPE, MALLEABLE IRON, SCREWED

Baker Ice Machine Co., Inc., South Windham, Me.
• Crane Co., Chicago, Ill.
• Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.

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- ● Grinnell Co., Inc., Providence, R. I.
- National Valve & Mfg. Co., Pittsburgh, Pa.
- Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
- Rhode Island Fittings Co., Hillsgrove, R. I.
- ● Walworth Co., New York, N. Y.

FLANGES, PIPE, NICKEL AND NICKEL ALLOY

- Cooper Alloy Foundry Co., Hillside, N. J.
- Flori Pipe Co., The, St. Louis, Mo.
- ● Ladish Co., Cudahy, Wis.
- MagniLastic Div., Cook Electric Co., Chicago, Ill.
- ● Phoenix Mfg. Co., Joliet, Ill.
- ● Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, LAP JOINT

- Alloy Steel Products Co., Linden, N. J.
- ● Crane Co., Chicago, Ill.
- Flori Pipe Co., The, St. Louis, Mo.
- Chicago Metal Mfg. Co., Chicago, Ill.
- ● Grinnell Co., Inc., Providence, R. I.
- Harrisburg Steel Corp., Harrisburg, Pa.
- ● Ladish Co., Cudahy, Wis.
- Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
- Midwest Piping & Supply Co., Inc., St. Louis, Mo.
- National Valve & Mfg. Co., Pittsburgh, Pa.
- Pennsylvania Forge Co., Philadelphia, Pa.
- ● Phoenix Mfg. Co., Joliet, Ill.
- ● Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
- Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
- Semet-Solvay Engineering Corp., New York, N. Y.
- ● Taylor Forge & Pipe Works, Chicago, Ill.
- ● Tube Turns, Inc., Louisville, Ky.
- Vogt Machine Co., Henry, Louisville, Ky.
- ● Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, SCREWED

- Alloy Steel Products Co., Linden, N. J.
- ● Crane Co., Chicago, Ill.
- Flori Pipe Co., The, St. Louis, Mo.
- ● Grinnell Co., Inc., Providence, R. I.
- Harrisburg Steel Corp., Harrisburg, Pa.
- ● Henry Valve Co., Chicago, Ill.
- ● Ladish Co., Cudahy, Wis.
- Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
- Midwest Piping & Supply Co., Inc., St. Louis, Mo.
- National Valve & Mfg. Co., Pittsburgh, Pa.
- Pennsylvania Forge Co., Philadelphia, Pa.
- ● Phoenix Mfg. Co., Joliet, Ill.
- ● Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
- Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
- ● Taylor Forge & Pipe Works, Chicago, Ill.
- ● Tube Turns, Inc., Louisville, Ky.
- Vilter Mfg. Co., Milwaukee, Wis.
- Vogt Machine Co., Henry, Louisville, Ky.
- ● Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, WELDING

- Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
- ● Crane Co., Chicago, Ill.
- Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
- Flori Pipe Co., The, St. Louis, Mo.
- ● Grinnell Co., Inc., Providence, R. I.
- Harrisburg Steel Corp., Harrisburg, Pa.
- ● Henry Valve Co., Chicago, Ill.
- ● Ladish Co., Cudahy, Wis.
- Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
- Midwest Piping & Supply Co., Inc., St. Louis, Mo.
- National Valve & Mfg. Co., Pittsburgh, Pa.
- ● Naylor Pipe Co., Chicago, Ill.
- Pennsylvania Forge Co., Philadelphia, Pa.
- ● Phoenix Mfg. Co., Joliet, Ill.
- ● Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
- Power Piping Div., Blaw Knox Co., Pittsburgh, Pa.
- Roessing Mfg. Co., Pittsburgh, Pa.
- Semet-Solvay Engineering Corp., New York, N. Y.
- ● Taylor Forge & Pipe Works, Chicago, Ill.
- ● Tube Turns, Inc., Louisville, Ky.
- Vilter Mfg. Co., Milwaukee, Wis.
- Vogt Machine Co., Henry, Louisville, Ky.
- ● Walworth Co., New York, N. Y.

FLARED FITTINGS, COPPER TUBE

See Fittings, Copper, Tube, Flared

FLARED FITTINGS, STEEL TUBE

See Fittings, Steel Tube, Flared

FLARING TOOLS FOR TUBING

See Tools, Flaring

FLEXIBLE COUPLINGS

See Couplings, Flexible

FLEXIBLE DUCT CONNECTIONS

See Connections, Duct, Flexible

FLEXIBLE METAL HOSE

See Hose, Metal and Fittings

FLOAT SWITCHES

See Switches, Float

FLOAT VALVES

See Valves, Float

FLOATS, STEAM TRAP, ETC.

- Bailey Co., Chas. M., San Francisco, Calif.
- Chicago Float Works, Inc., Chicago, Ill.
- Clark Controller Co., Cleveland, O.
- ● Crane Co., Chicago, Ill.
- Cryer Trap & Valve Co., Inc., New York, N. Y.
- d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
- Harris & Co., Arthur, Chicago, Ill.
- Hercules Float Wks., Springfield, Mass.
- ● Hoffman Specialty Co., Indianapolis, Ind.
- Huyette Co., Inc., Paul B., Philadelphia, Pa.
- ● Kieley & Mueller, Inc., North Bergen, N. J.
- McAlear Mfg. Co., Chicago, Ill.
- Milwaukee Valve Co., Milwaukee, Wis.
- Naugatuck Mfg. Co., Union City, Conn.
- ● Nicholson & Co., W. H., Wilkes-Barre, Pa.
- Reichert Float & Mfg. Co., Toledo, O.
- Reliance Gauge Column Co., Cleveland, O.
- Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
- ● Swartwout Co., Cleveland, O.
- Templeton Bros., Hyde Park, Mass.
- Templeton Mfg. Co., Hyde Park, Mass.
- ● Trane Co., The, La Crosse, Wis.
- Vapor Specialty Co., New York, N. Y.
- Watson & McDaniel Co., Philadelphia, Pa.
- Williams Gauge Co., The, Pittsburgh, Pa.

FLOOR AND CEILING PLATES

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FLOW CONTROL VALVES

See Valves, Flow Control

FLOW METERS

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FLOW SWITCHES

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FORGED STEEL VALVES

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FRESHENERS, AIR

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FUEL ECONOMIZERS

See Economizers, Fuel

FUEL OIL UNITS

See Units, Fuel Oil

FURNACES, DUCT

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FURNACES, WARM AIR, FOR INDUSTRIAL AND LARGE BUILDING HEATING

- ● Airtherm Mfg. Co., St. Louis, Mo.
- American Foundry & Furnace Co., Bloomington, Ill.
- American Furnace Co., St. Louis, Mo.
- Arcweld Mfg. Co., Inc., Seattle, Wash.
- Beck Engineering Combustion Kompany, St. Louis, Mo.
- ● Bryant Heater Co., Cleveland, O.
- ● Campbell Heating Co., Des Moines, Ia.
- Campbell Heating Co., E. K., Kansas City, Mo.
- Certified Furnace Co., Div. of Stainless & Steel Products Co., St. Paul, Minn.
- Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
- Demuth & Sons, Charles, Mineola, L. I., N. Y.
- ● Dravo Corp., Pittsburgh, Pa.
- Grossenbacher Furnace Co., Overland, Mo.
- International Sales Co., San Francisco, Calif.

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● Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Saugas, Mass.
Lee Engineering Co., Youngstown, O.
Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y., and Columbus, O.
Magirl Foundry & Furnace Co., Bloomington, Ill.
Majestic Co., Huntington, Ind.
Mayflower Air-Conditioners, Inc., St. Paul, Minn.
McPherson Furnace & Supply Co., Portland, Ore.
Meyer Furnace Co., The, Peoria, Ill.
Moncrief Furnace Co., Atlanta, Ga.
Montag Stove & Furnace Wks., Portland, Ore.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Naco Mfg. Co., Huntington Park, Calif.
National Heater Co., St. Paul, Minn.
National Mfg. & Engineering Co., Detroit, Mich.
Northwest Foundry & Furnace Co., Portland, Ore.
Palmer Mfg. Corp., Phoenix, Ariz.
Payne Furnace Co., Beverly Hills, Calif.
Perfection Stove Co., Cleveland, O.
Rosebraugh Co., W. W., Salem, Ore.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Smith Heater Co., Peter, Dearborn, Mich.
● Surface Combustion Corp., Toledo, O.
Syncromatic Corp., Watertown, Wis.
XXth Century Heating & Ventilating Co., Akron, O.
● United States Radiator Corp., Detroit, Mich.

FUSIBLE LINKS

See Links, Fusible

GAGE GLASSES

See Glasses, Gage

GAGE TESTERS

See Testers, Gage, Dead Weight

GAGES, AIR FILTER

Defender Instrument and Regulator Co., St. Louis, Mo.
● Dollinger Corp., Rochester, N. Y.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
● Hayes Corp., Michigan City, Ind.
Herbusch Corp., The, St. Louis, Mo. (Warning device)
Hill, E. Vernon, Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Research Products Corp., Madison, Wis.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, DRAFT

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Cole-Sewell Engineering Co., St. Paul, Minn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Hill, E. Vernon, Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Moeller Instrument Co., Richmond Hill, N. Y.
Precision Scientific Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, PRESSURE

Ashton Valve Co., Cambridge, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Belfield Co., H., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Wks., Detroit, Mich.
● Dole Valve Co., The, Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Inc., New York, N. Y.
● Hays Corp., Michigan City, Ind.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
Hill, E. Vernon, Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Mouat Vapor Heating Co., The, Cleveland, O.
Norgren Co., C. A., Denver, Colo.
Perfex Corp., Milwaukee, Wis.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Wallace & Tiernan Co., Inc., Newark, N. J.
Weksler Thermometer Corp., New York, N. Y.

GAGES, INDICATING, VACUUM

Ashton Valve Co., Cambridge, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Belfield Co., H., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
● Dole Valve Co., The, Chicago, Ill.
Electro Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Inc., New York, N. Y.
● Hayes Corp., Michigan City, Ind.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Mouat Vapor Heating Co., The, Cleveland, O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Skaneateles Mfg. Co., Inc., Syracuse, N. Y.
Stewart-Warner Corp., Chicago, Ill.
Stokes Machine Co., F. J., Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
● Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Wallace & Tiernan, Inc., Newark, N. J.
Weksler Thermometer Corp., New York, N. Y.

GAGES, LIQUID LEVEL

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Injector Co., Detroit, Mich.
Applied Mechanics Co., Boston, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bearlee Products Co., Green Bay, Wis.
Belfield Co., H., Philadelphia, Pa.
Bordo Co., Inc., L. J., Glenside, Pa.
Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Caldwell Co., W. E., Louisville, Ky.
Defender Instrument and Regulator Co., St. Louis, Mo.
Diamond Power Specialty Corp., Detroit, Mich.

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Foxboro Co., Foxboro, Mass.
● Frick Co., Waynesboro, Pa.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Harvey, Inc., Sid, Valley Stream, N. Y.
● Hays Corp., Michigan City, Ind.
● Henry Valve Co., Chicago, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
King Engineering Corp., Ann Arbor, Mich.
King Gauge & Mfg. Co., New Haven, Conn.
Klingerite, Inc., New York, N. Y.
● Krueger Sentry Gauge Co., Green Bay, Wis.
Liquidometer Corp., Long Island City, N. Y.
Lonergan Co., J. E., Philadelphia, Pa.
● Lunkenheimer Co., Cincinnati, O.
Marshalltown Mfg. Co., Marshalltown, Ia.
McAlear Mfg. Co., Chicago, Ill.
Mel-Gauge Co., East Haven, Conn.
Mel Supply Co., The, New Haven, Conn.
Meriam Instrument Co., The, Cleveland, O.
Moore Products Co., Philadelphia, Pa.
Morse-Smith-Morse, Inc., Watertown, Mass.
Nason Co., Detroit, Mich.
Penberthy Injector Co., Detroit, Mich.
Petroleum Equipment Mfg. Co., New Haven, Conn.
Petrometer Corp., Long Island City, N. Y.
Powell Co., Wm., Cincinnati, O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Reliance Gauge Column Co., Cleveland, O.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Scully Signal Co., Cambridge, Mass. (Audible)
Stewart-Warner Corp., Chicago, Ill.
Swift Lubricator Co., Elmira, N. Y.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Techtmann Industries, Inc., Milwaukee, Wis.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Viking Pump Co., Cedar Falls, Ia.
Wallace & Tiernan Co., Newark, N. J.
Williams Gauge Co., The, Pittsburgh, Pa. (Water)
Wright-Austin Co., Detroit, Mich.
● Yarnall-Waring Co., Philadelphia, Pa.

GALVANIZED SHEETS

See Sheets, Steel, Galvanized

GALVANNEALED SHEETS

See Sheets, Steel, Galvannealed

GAS BURNERS

See Burners, Gas

GAS ENGINES

See Engines, Gas

GAS FIRED RADIATORS

See Radiators, Gas Fired

GAS PRESSURE REGULATORS

See Regulators, Pressure, Gas

GAS VOLUME METERS

See Meters, Volume, Air and Gas

GASKETS

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill. (Felt, rubber)
Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Akron Metallic Gasket Co., Akron, O. (Metal & metal asbestos)
Alpha Metals, Inc., Brooklyn, N. Y.
Anchor Packing Co., Philadelphia, Pa. (Asbestos)
Armstrong Cork Co., Lancaster, Pa., (Cork & cork composition)
Austin-Mason Co., New York, N. Y.
Azor Corp., Irvington, N. J. (Spiral wound)
Baldwin Belting, Inc., New York, N. Y.
Belmont Packing & Rubber Co., Philadelphia, Pa.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y. (Lead)
Chase Brass & Copper Co., Waterbury, Conn. (Brass and copper)
Chicago-Wilcox Mfg. Co., Chicago, Ill.
Clow & Sons, James B., Chicago, Ill.
Continental Diamond Fibre Co., Newark, Del.
Continental Rubber Wks., Erie, Pa.
● Crane Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y. (Asbestos)
Durabla Mfg. Co., New York, N. Y. (Asbestos fibre)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Endura Mfg. Corp., Quakertown, Pa. (Paper, fibre)
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill. (Heat and oil resisting)
Felters Company, The, Boston, Mass.
Flexitallic Gasket Co., Camden, N. J. (Metal, asbestos)
Flexlock Corp., Akron, O.
● Frick Co., Waynesboro, Pa.
Garlock Packing Co., Palmyra, N. Y. (Rubber, asbestos, fibre, semi-metallic)
Gates Rubber Co., The, Denver, Colo.
Gatke Corp., Chicago, Ill.
General Electric Co., Chemical Dept., Pittsfield, Mass.
Goetze Branch, Johns-Manville, New York, N. Y.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
● Grant Wilson, Inc., Chicago, Ill. (Asbestos)
Graton & Knight Co., Worcester, Mass. (Leather)
Greene, Tweed & Co., North Wales, Pa.
Houghton & Co., E. F., Philadelphia, Pa. (Leather)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Klingerit, Inc., New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J. (Metal, metal asbestos)
Mitchell & Smith, Inc., Detroit, Mich. (Cork)
Mortell Co., J. W., Kankakee, Ill.
National Engineering Products, Inc., Washington, D. C. (Plastic)
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber and asbestos)
Resistoflex Corp., Belleville, N. J.
Ruberoid Co., New York, N. Y. (Asbestos)
Schieren Co., Chas. A., New York, N. Y.
Sherwin-Williams Co., The, Cleveland, O.
Smooth-On Mfg. Co., Jersey City, N. J. (Corrugated iron)
Steel Improvement & Forge Co., Cleveland, O.
Stokes Molded Products, Trenton, N. J. (Hard rubber)
Technical Ply-Woods, Chicago, Ill.
Thermoid Co., Trenton, N. J.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Gasket Co., Camden, N. J.
United States Rubber Co., New York, N. Y. (Rubber, asbestos)
United States Stoneware Co., New York, N. Y.
Vibration Engineering Co., The, New York, N. Y. (Cork)
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Western Felt Wks., Chicago, Ill. (Felt)
● Wilson, Inc., Grant, Chicago, Ill. (Asbestos)

GASOLINE FIRED HEATERS

See Heaters, Gasoline Fired

GATE VALVES

See Valves, Gate

GATES, BLAST

Allington & Curtis Mfg. Co., Saginaw, Mich.
Berger Bros., Co., Philadelphia, Pa.
● Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
● Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis, Minn.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Kirk & Blum Mfg. Co., Cincinnati, O.
Maysteel Products, Inc., Milwaukee, Wis.
Newcomb Engineering Co., Grand Rapids, Mich.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
R-S Products Corp., Philadelphia, Pa.
Spencer Turbine Co., Hartford, Conn.
Thermix Corp., The, Greenwich, Conn.
Western Blower Co., Seattle, Wash.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.

GLASS, HEAT ABSORBING

See Windows, Heat Insulating

GLASS PIPE

See Pipe, Glass

GLASSES, GAGE

Bache, Semon & Co., New York, N. Y.
Chicago Specialty Mfg. Co., Chicago, Ill.
Corning Glass Works, Corning, N. Y.
Diamond Power Specialty Corp., Detroit, Mich.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fischer & Porter Co., Hatboro, Pa.
● Henry Valve Co., Chicago, Ill.
Klingerit, Inc., New York, N. Y.
Libbey-Owens-Ford Glass Co., Toledo, O.
● Lunkenheimer Co., Cincinnati, O.
Powell Co., Wm., Cincinnati, O.
Semon Bache & Co., New York, N. Y.
Swift Lubricator Co., Elmira, N. Y.

GLASSES, SIGHT, FOR PIPE LINES

● American District Steam Co., North Tonawanda, N. Y.
Bowser, Inc., Fort Wayne, Ind.

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Cochrane Corp., Philadelphia, Pa.
Corning Glass Works, Corning, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Libbey-Owens-Ford Glass Co., Toledo, O.
Mueller Brass Co., Port Huron, Mich.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Weatherhead Co., Cleveland, O.

GLOBE VALVES

See Valves, Globe

GOVERNORS, PUMP

Atlas Valve Co., Inc., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Boylston Steam Specialty Co., Chicago, Ill.
Burrows Mfg. Co., F. A., York, Pa.
● Cash Co., A. W., Decatur, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
● Hagan Corp., Pittsburgh, Pa.
Keckley Co., O. C., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Northern Equipment Co., Erie, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sampsel Time Control, Inc., Spring Valley, Ill.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
● Swartwout Co., Cleveland, O.
Watson & McDaniel Co., Philadelphia, Pa.
● Webster & Co., Warren, Camden, N. J.
Williams Gauge Co., The, Pittsburgh, Pa.

GRILLES

See also Diffusers; Panels, Perforated, for Air Diffusion; Registers

A. & A. Register Co., Cleveland, O.
A-J Mfg. Co., Kansas City, Mo.
Acme Mfg. Co., Philadelphia, Pa.
Air Control Products, Inc., Coopersville, Mich.
● Air Devices, Inc., New York, N. Y.
AirO-Fin Register Co., Detroit, Mich.
Alton Mfg. Co., Dallas, Tex.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
● Auer Register Co., Cleveland, O.
● Barber-Colman Co., Rockford, Ill.
Beckley Perforating Co., Garwood, N. J.
Best Register Co., Milwaukee, Wis.
Central Wire & Iron Works, Des Moines, Ia.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
Crown Iron Works, Minneapolis, Minn.
Decatur Iron & Steel Co., Decatur, Ala.
Diamond Mfg. Co., Wyoming, Pa.
Eaglesfield Ventilator Co., Indianapolis, Ind. (wood)
Empire Ventilation Equipment Co., Long Island City, N. Y.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Hendrick Mfg. Co., Carbondale, Pa.
● Independent Register Co., Cleveland, O.
Jamieson Mfg. Co., Dallas, Tex.
Johnston & Chapman Co., Chicago, Ill.
Lockjoint Wood Products Co., Witchita, Kans. (Wood)
Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
Midco Register Corp., St. Paul, Minn.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Mundt & Sons, Charles, Jersey City, N. J.
Newman Brothers, Inc., Cincinnati, O.
Register & Grille Mfg. Co., Brooklyn, N. Y.
Reliable Perforating Co., Chicago, Ill.
Rheem Mfg. Co., New York, N. Y.
Rock Island Register Co., Rock Island, Ill.
Schoedinger, F. O., Columbus, O.
Smith Co., J. B., Philadelphia, Pa.
● Standard Stamping & Perforating Co., Chicago, Ill.
Stewart Mfg. Co., Inc., Bloomfield, N. J.
● Titus Mfg. Corp., Waterloo, Iowa.
Turnbull Mfg. & Dist. Co., Detroit, Mich.
● Tuttle & Bailey, Inc., New Britain, Conn.
● United States Air Conditioning Corp., Minneapolis, Minn.

United States Register Co., Battle Creek, Mich.
● Utility Appliance Corp., Los Angeles, Calif.
Viking Mfg. Corp., Cleveland, O.
Western Wire & Iron Works, Inc., Chicago, Ill. (metal)
Wickwire Spencer Steel Div. of Colorado Fuel & Iron Corp., Buffalo, N. Y.
Young Regulator Co., Cleveland, O.

GUNS AND POTS, SMOKE AND SMUDGE, FOR TESTING AIR MOVEMENT

Hill, E. Vernon, Chicago, Ill.
Newman Co., Inc., I. C., New York, N. Y. (smoke containers)
Pains Fireworks Display Co., New York, N. Y.

HAND SHEARS

See Shears and Snips, Hand

HANGERS OR BRACKETS, RADIATOR

American Foundry & Furnace Co., Bloomington, Ill.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Arjac Products, Inc., Rochester, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Carpenter & Paterson, Inc., East Boston, Mass.
● Carty & Moore Engineering Co., Detroit, Mich.
● Crane Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
● Grinnell Co., Inc., Providence, R. I.
Hartmann Co., Chas., Brooklyn, N. Y.
Healy Ruff Co., St. Paul, Minn.
Jennison Co., Fitchburg, Mass. (Adjustable radiator foot rest)
McAlear Mfg. Co., Chicago, Ill.
Meco, Inc., Portland, Ore.
National Radiator Co., The, Johnstown, Pa.
● United States Radiator Corp., Detroit, Mich.
Western Hanger Co., San Francisco, Calif.

HANGERS AND SUPPORTS, DUCT

Hexdall Co., A. M., Morris, Ill.
Meco, Inc., Portland, Ore.
Moore Co., Goodloe E., Danville, Ill.
Powder Power Tool Corp., Portland, Ore.
● Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)

HANGERS AND SUPPORTS, PIPE

Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
● American District Steam Co., North Tonawanda, N. Y.
Carpenter & Paterson, Inc., East Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Crawford Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
● Frick Co., Waynesboro, Pa.
Genspring, Inc., New York, N. Y.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Iwan Brothers, Inc., South Bend, Ind.
Jarecki Mfg. Co., Erie, Pa.
Meco, Inc., Portland, Ore.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
● Minerallac Electric Co., Chicago, Ill.
Moore Co., Goodloe E., Danville, Ill.
National Valve & Mfg. Co., Pittsburgh, Pa.
Packless Metal Products Corp., New Rochelle, N. Y. (Flexible fasteners for metal hose and tubing)
Paine Co., Chicago, Ill.
Powder Power Tool Corp., Portland, Ore.
Power Piping Div., Blaw-Knox Co., Pittsburgh, Pa.
Ravena Iron Co., Ravena, N. Y.
Reintjes Co., Geo. P., Kansas City, Mo.
● Ric-wiL Co., Cleveland, O. (Underground)
Rockwood Sprinkler Co., Worcester, Mass.
Roessing Mfg. Co., Pittsburgh, Pa.
Russell Mfg. Co., John M., Naugatuck, Conn.
Truscon Steel Co., Youngstown, O.
Western Wire Products Co., St. Louis, Mo.

HARD RUBBER PIPE AND FITTINGS

See Pipe, Hard Rubber; Fittings, Pipe, Hard Rubber

HEADERS, WELDED

● Acme Industries, Inc., Jackson, Mich.
American Locomotive Co., Alco Products Div., New York, N. Y.
Baker Ice Machine Co., Inc., South Windham, Me.
Ball Welding Works, Inc., Oakland, Calif.
Biggs Boiler Works Co., E. Akron, O.
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.

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Columbian Steel Tank Co., Kansas City, Mo.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Crane Co., Chicago, Ill.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
● Grinnell Co., Inc., Providence, R. I.
International Engineering Wks., Inc., Framingham, Mass.
Kellogg Co., M. W., The, New York, N. Y.
Lumsden & Van Stone Co., South Boston, Mass.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
● Naylor Pipe Co., Chicago, Ill.
Ohio Pipe Bending & Mach. Co., Cleveland, O.
● Patterson-Kelley Co., Inc., East Stroudsburg, Pa.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
● Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Power Piping Div., Blaw-Knox Co., Pittsburgh, Pa.
● Rempe Co., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Semet-Solvay Engineering Corp., New York, N. Y.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw Kendall Engineering Co., Toledo, O.
Vilter Mfg. Co., Milwaukee, Wis.
● Walworth Co., New York, N. Y.
Western Piping & Engineering Co., San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.

HEADS, EXHAUST, FOR PIPE LINES

Aeolus Dickinson, Chicago, Ill.
Cochrane Corp., Philadelphia, Pa.
Dickinson, Aeolus, Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Hoppes Mfg. Co., Inc., Springfield, O.
● Illinois Engineering Co., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Wright-Austin Co., Detroit, Mich.

HEADS, SPRINKLER

April Showers Co., Washington, D. C.
Binks Mfg. Co., Chicago, Ill.
Cleghorn Co., Boston, Mass.
● Grinnell Co., Inc., Providence, R. I.
Hodgman Mfg. Co., Taunton, Mass.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Sprinkler Co., Pasadena, Calif.

HEAT EXCHANGERS

See Chillers, Water; Condensers, Refrigerating; Exchangers, Heat; Surface, Cooling; Surface, Heating

HEAT PUMPS

See Units, Air Conditioning, Reverse Refrigeration Cycle

HEATERS, AIR, DIRECT FIRED

● Air Devices, Inc., New York, N. Y.
● Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Beck Engineering Combustion Kompany, St. Louis, Mo.
● Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.
Columbus Heating & Ventilating Co., Columbus, O.
Davis Co., Inc., Herbert H., Chicago, Ill.
Demuth & Sons, Charles, Mineola, L. I., N. Y.
Despatch Oven Co., Minneapolis, Minn.
● Dravo Corp., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
● Fitzgibbons Boiler Co., Inc., New York, N. Y.
General Gas Light Co., Kalamazoo, Mich.
● Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Saugas, Mass.
Lee Engineering Co., Youngstown, O.
Magirl Foundry & Furnace Co., Bloomington, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Mid-Continent Metal Products Co., Chicago, Ill.
National Heater Co., St. Paul, Minn.
National Mfg. & Engineering Co., Detroit, Mich.
Newcomb Engineering Co., Grand Rapids, Mich.
Palmer Mfg. Corp., Phoenix, Ariz.
Peters-Dalton, Inc., Detroit, Mich.
Prat-Daniel Corp., Port Chester, N. Y.
Reznor Mfg. Co., Mercer, Pa.
Ross Engineering Corp., J. O., New York, N. Y.
Sawyer Heating Co., Detroit, Mich.
● Shafco Distributing Corp., Detroit, Mich.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Smith, Inc., James Campbell, Mentor, O.
● Surface Combustion Corp., Toledo, O.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.
XXth Century Heating and Ventilating Co., Akron, O.
Whiting Corp, Harvey, Ill.
Williams, Inc., F. C., Dearborn, Mich.

HEATERS, CONVECTION

See Radiation, Convection Type

HEATERS, DUCT, ELECTRIC

Brown Fintube Co., The, Elyria, O.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Despatch Oven Co., Minneapolis, Minn.
Electromode Corp., Rochester, N. Y.
Falcon Equipment Co., New Brighton, Pa.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hynes Electric Heating Co., Camden, N. J.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Tenney Engineering, Inc., Newark, N. J.
Trent Inc., Philadelphia, Pa.
● Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, DUCT, GAS

Beck Engineering Combustion Kompany, St. Louis, Mo.
● Bryant Heater Co., Cleveland, O.
● Dravo Corp., Pittsburgh, Pa.
General Gas Light Co., Kalamazoo, Mich.
● Hayes Furnace & Mfg. Co., Inc., Los Angeles, Calif.
International Sales Co., San Francisco, Calif.
Kehm Corp., The, Chicago, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Naco Mfg. Co., Huntington Park, Calif.
Norman Products Co., Inc., Columbus, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Payne Furnace Co., Beverly Hills, Calif.
Reznor Mfg. Co., Mercer, Pa.
Richmond Radiator Co., New York, N. Y.
Royal Heaters, Inc., Alhambra, Calif.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
● Surface Combustion Corp., Toledo, O.
XXth Century Heating and Ventilating Co., Akron, O.
● Utility Appliance Corp., Los Angeles, Calif.

HEATERS, FEEDWATER

See Deaerators

HEATERS, GASOLINE FIRED (FOR AIRCRAFT AND PORTABLE GROUND USE)

Fluid Heat Div., Anchor Post Fence Co., Baltimore, Md.
Selas Corp of America, Strato-Heater Div., Philadelphia, Pa.
Stewart-Warner Corp., Chicago, Ill.
● Surface Combustion Corp., Toledo, O.

HEATERS, INDIRECT, SUBMERGED

● American District Steam Co., North Tonawanda, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., Elyria, O.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
● General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., South Boston, Mass
Graham Mfg. Co., Inc., New York, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
● Taco Heaters, Inc., New York, N. Y.
Western Blower Co., Seattle, Wash.

HEATERS, STEAM JET, FOR LIQUIDS

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Gerstein & Cooper Co., South Boston, Mass.
Penberthy Injector Co., Detroit, Mich.
Schutte & Koerting Co., Philadelphia, Pa.

HEATERS, STRIP AND IMMERSION, ELECTRIC

American Instrument Co., Silver Spring, Md.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Falcon Equipment Co., New Brighton, Pa.

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General Electric Co., Apparatus Dept., Schenectady, N. Y.
H. & A. Co., Buffalo, N. Y.
Hynes Electric Heating Co., Camden, N. J.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Red Spot Electric Co., Tacoma, Wash.
Techtmann Industries, Inc., Milwaukee, Wis.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, UNIT, ELECTRIC HEATING ELEMENT

Consolidated Car-Heating Co., Inc., Albany, N. Y.
Electromode Corp., Rochester, N. Y.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Heating Assurance, Inc., Spokane, Wash.
Hynes Electric Heating Co., Camden, N. J.
● Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Johnson Fan & Blower Corp., Chicago, Ill.
Lintern Co., Berea, O.
Red Spot Electric Co., Tacoma, Wash.
Roberson Co., L. N., Seattle, Wash.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, UNIT, GAS FIRED

● Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
Automatic Gas Equipment Co., Pittsburgh, Pa.
Beck Engineering Combustion Kompany, St. Louis, Mo.
● Bryant Heater Co., Cleveland, O.
Clow & Sons, James B., Chicago, Ill.
● Dravo Corp., Pittsburgh, Pa.
General Gas Light Co., Kalamazoo, Mich.
● Hastings Air Conditioning Co., Hastings, Neb.
● Ilg Electric Ventilating Co., Chicago, Ill.
Lee Engineering Co., Youngstown, O.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Naco Mfg. Co., Huntington Park, Calif.
● Nat Corp., Kansas City, Mo.
Norman Products Co., Inc., Columbus, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Reznor Mfg. Co., Mercer, Pa.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
● Surface Combustion Corp., Toledo, O.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Welding Service Co., Wichita, Kan.
● Zink Co., John, Tulsa, Okla.

HEATERS, UNIT, OIL FIRED

● Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
Beck Engineering Combustion Kompany, St. Louis, Mo.
● Dravo Corp., Pittsburgh, Pa.
Lee Engineering Co., Youngstown, O.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Perfection Stove Co., Cleveland, O.
Sawyer Heating Co., Detroit, Mich.
● Shafco Distributing Corp., Detroit, Mich.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.

HEATERS, UNIT, STEAM AND HOT WATER

● Airtherm Mfg. Co., St. Louis, Mo.
American Blower Corp., Detroit, Mich.
American Thermal Industries, Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Beacon-Morris Corp., Boston, Mass.
Bern's Specialty Mfg. Co., Chicago, Ill.
● Bishop & Babcock Mfg. Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
Burnham Corp., Boiler Div., Irvington, N. Y.
Campbell Heating Co., E. K., Kansas City, Mo.
● Carrier Corp., Syracuse, N. Y.
Champion Unit Heater Co., Chicago, Ill.
Chicago Fan & Fin Coil Co., Chicago, Ill.
● Clarage Fan Co., Kalamazoo, Mich.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
● Dunham Co., C. A., Chicago, Ill.
● Fedders-Quigan Corp., Buffalo, N. Y.
● Grinnell Co., Inc., Providence, R. I.
Hartzell Propeller Fan Co., Piqua, O.
● Hastings Air Conditioning Co., Hastings, Neb.
Heat Transfer Products, Inc., Carbondale, Pa.
● Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Mfg. & Engrg. Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Johnson Fan & Blower Corp., Chicago, Ill.
● Kennard Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Kisco Boiler & Enginering Co., St. Louis, Mo.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
● McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J. Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
● Nelson Corp., Herman, Moline, Ill.
● Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Refrigeration Economics Co., Inc., Canton, O.
● Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Semco Mfg. Co., Nashville, Tenn.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wilson Engineering Corp., Chicago, Ill.
● Wing Mfg. Co., L. J., New York, N. Y.
● Young Radiator Co., Racine, Wis.

HEATERS, VENTILATION

See Ventilators, Unit

HEATERS, WATER, CAST IRON, COAL FIRED

Adams Co., The, Dubuque, Ia.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Burnham Corp., Boiler Div., Irvington, N. Y.
Cleghorn Co., Boston, Mass.
Eastern Foundry Co., Peerless Heater Div., Boyertown, Pa.
Gehl Bros. Mfg. Co., West Bend, Wis.
Glo Heat Equipment Co., New York, N. Y.
Pittsburgh Water Heater Corp., Pittsburgh, Pa.
International Heater Co., Utica, N. Y.
Prox Co., Inc., Frank, Terre Haute, Ind.
● Smith Co., Inc., H. B., The, Westfield, Mass.
● Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
Stokol-Stoker Co., Inc., Indianapolis, Ind.
● United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Michigan City, Ind.

HEATERS, WATER, ELECTRIC

Bastian-Morley Co., Inc., LaPorte, Ind.
Bogue Electric Co., Paterson, N. J.
Brown Fintube Co., Elyria, O.
● Clayton & Lambert Mfg. Co., Louisville, Ky.
Cutler-Hammer, Inc., Milwaukee, Wis.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Gerstein & Cooper Co., South Boston, Mass.
Glo Heat Equipment Co., New York, N. Y.
Hotpoint Inc., Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Hynes Electric Heating Co., Camden, N. J.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Red Spot Electric Co., Tacoma, Wash.
Rheem Mfg. Co., New York, N. Y.
Smith Corp., A. O., Milwaukee, Wis.
Trent Inc., Philadelphia, Pa.
Westinghouse Electric Corp., Pittsburgh, Pa.

HEATERS, WATER, GAS FIRED

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bastian-Morley Co., Inc., LaPorte, Ind.
Birchfield Boiler, Inc., Tacoma, Wash.
Brown Fintube Co., Elyria, O.
● Bryant Heater Co., Cleveland, O.
● Clayton & Lambert Mfg. Co., Louisville, Ky.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
Gerstein & Cooper Co., South Boston, Mass.
Glo Heat Equipment Co., New York, N. Y.
Handley Brown Heater Co., Jackson, Mich.
Heat Equipment not Inc., Chicago, Ill.
Hook & Ackerman, Inc., New York, N. Y.
Hotstream Heater Co., Cleveland, O.
Kehm Corp., The, Chicago, Ill.
Kresno-Stamm Mfg. Co., (America), Inc., Palisades Park, N. J.
Mission Appliance Corp., Los Angeles, Calif.
Montgomery Bros., San Francisco, Calif.
Mueller Furnace Co., L. J., Milwaukee, Wis.

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National Radiator Co., The, Johnstown, Pa.
Pittsburgh Water Heater Corp., Pittsburgh, Pa.
Richmond Radiator Co., New York, N. Y.
Rheem Mfg. Co., New York, N. Y.
Rotary Mfg. Co., Los Angeles, Calif.
Ruud Mfg. Co., Pittsburgh, Pa.
Schoedinger, F. O., Columbus, O.
Sellers Engineering Co., Chicago, Ill.
● Smith Co., Inc., H. B., The, Westfield, Mass.
Smith Corp., A. O., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
● United States Radiator Corp., Detroit, Mich.

HEATERS, WATER, INDIRECT

Akwa Heaters, Inc., New York, N. Y.
● American District Steam Co., North Tonawanda, N. Y.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
● Bell & Gossett Co., Morton Grove, Ill.
● Bryant Heater Co., Cleveland, O.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Ferguson & Lange Foundry Co., Chicago, Ill.
● General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., South Boston, Mass.
Graham Mfg. Co., Inc., New York, N. Y.
Hook & Ackerman, Inc., New York, N. Y.
Hotstream Heater Co., Cleveland, O.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
Kehm Corp., The, Chicago, Ill.
Lewis & Co., Joseph E., Baltimore, Md.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Richmond Radiator Co., New York, N. Y.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
● Taco Heaters, Inc., New York, N. Y.
● Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Vapor Car Heating Co., Inc., Chicago, Ill.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.

HEATERS, WATER, INDIRECT, COMBINATION TANK AND TANKLESS

● Bell & Gossett Co., Morton Grove, Ill.
Bethlehem Foundry & Machine Co., Bethlehem, Pa.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Burnham Corp., Boiler Div., Irvington, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Gerstein & Cooper Co., South Boston, Mass.
Heat Equipment not Inc., Chicago, Ill.
Hook & Ackerman, Inc., New York, N. Y.
Hotstream Heater Co., Cleveland, O.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
Penberthy Injector Co., Detroit, Mich.
Richmond Engineering Co., Inc., Richmond, Va.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.

HEATERS, WATER, OIL FIRED

Aeroil Products Co., West New York, N. J. (portable)
● Air Devices, Inc., New York, N. Y.
Airtemp, Div. of Chrysler Corp., Dayton, O.
Aldrich Co., The, Wyoming, Ill.
Auburn Burner Co., Auburn, Ind.
Bastian-Morley Co., Inc., LaPorte, Ind.
Birchfield Boiler, Inc., Tacoma, Wash.
Brown Electric Co., Forest Hills, N. Y.
Brown Fintube Co., The, Elyria, O.
Catskill Metal Works, Inc., Catskill, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
● Clayton & Lambert Mfg. Co., Louisville, Ky.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Dewey Shepard Boiler Co., Peru, Ind.
Electrol Burner Mfg. Co., Inc., Rutherford, N. J.
Gerstein & Cooper Co., South Boston, Mass.
Glo Heat Equipment Co., New York, N. Y.
Hanson-Gates Mfg. Co., Inc., Reading, Mass.
Heat Equipment not Inc., Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Johnson Co., S. T., Philadelphia, Pa.
Kleen-Heet, Inc., Chicago, Ill.
Kresno-Stamm Mfg. Co., (America), Inc., Palisades Park, N. J.
Lonergan Mfg. Co., Albion, Mich.
Nu-way Corp., The, Rock Island, Ill.
● Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
● Petroleum Heat & Power Co., Stamford, Conn.
Preferred Utilities Mfg. Corp., New York, N. Y.
● Ray Oil Burner Co., San Francisco, Calif.
Reif-Rexoil, Inc., Buffalo, N. Y.
Rheem Mfg. Co., New York, N. Y.
Scott-Newcomb, Inc., St. Louis, Mo.
● Smith Co., Inc., H. B., The, Westfield, Mass.
● Spencer Heater Div., Avco Corp., Williamsport, Pa.
Stokol-Stoker Co., Inc., Indianapolis, Ind.
● United States Radiator Corp., Detroit, Mich.
Vapor Car Heating Co., Inc., Chicago, Ill.
Viking Mfg. Corp., Cleveland, O.
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
York Electric and Machine Co., York, Pa.

HEATERS, WATER, STEAM, INSTANTANEOUS

Akwa Heaters, Inc., New York, N. Y.
● American District Steam Co., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Brownell Co., Dayton, O.
Coe Mfg. Co., Painesville, O.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downington, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
● General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., South Boston, Mass.
Graham Mfg. Co., Inc., New York, N. Y.
Hasco Valve & Machine Co., Milwaukee, Wis.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Wks. & Alberger Heater Co., Buffalo, N. Y.
● Johnson Corp., The, Three Rivers, Mich.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lewis & Co., Joseph E., Baltimore, Md.
Montgomery Bros., San Francisco, Calif.
Marion Machine Foundry & Supply Co., Marion, Ind.
National Pipe Bending Co., New Haven, Conn.
O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pick Mfg. Co., West Bend, Wis. (direct steam injection)
Quaker City Iron Works, Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
● Swartwout Co., Cleveland, O.
● Taco Heaters, Inc., New York, N. Y.
Whitlock Mfg. Co., Hartford, Conn.

HEATERS, WATER, STEAM, STORAGE

Akwa Heaters, Inc., New York, N. Y.
● American District Steam Co., North Tonawanda, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Bros Boiler & Manufacturing Co., Wm., Minneapolis, Minn.
● Brownell Co., Dayton, O.
Burnham Corp., Boiler Div., Irvington, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Co., Elizabeth, N. J.
Downingtown Iron Works, Downington, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
● General Fittings Co., Providence, R. I.
Gerstein & Cooper Co., South Boston, Mass.
Heat Transfer Products, Inc., Carbondale, Pa.
Howard Iron Wks. & Alberger Heater Co., Buffalo, N. Y.
International Engineering Wks., Inc., Framingham, Mass.
● Johnson Corp., The, Three Rivers, Mich.
● Kewanee Boiler Corp., Kewanee, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Manitowoc Boiler Wks., Manitowoc, Wis.
Marion Machine Foundry & Supply Co., Marion, Ind.
National Pipe Bending Co., New Haven, Conn.
O'Brien Steam Specialty Co., Syracuse, N. Y.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Penberthy Injector Co., Detroit, Mich.
Quaker City Iron Works, Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Rotary Mfg. Co., Los Angeles, Calif.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Stout & Sons, David, St. Louis, Mo.
● Swartwout Co., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
Warren Electric Appliance Co., Warren, Pa. (Electric)
Waterfilm Boilers, Inc., Jersey City, N. J.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.

HEATERS, WATER, STEEL, COAL FIRED

Aeroil Products Co., West New York, N. J. (Portable)
Birchfield Boiler, Inc., Tacoma, Wash.

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Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Catskill Metal Works, Inc., Catskill, N. Y.
● Fitzgibbons Boiler Co., New York, N. Y.
Heat Equipment not Inc., Chicago, Ill.
International Engineering Wks., Inc., Framingham, Mass.
Johnson Bros., Inc., Ferrysburg, Mich.
● Kewanee Boiler Corp., Kewanee, Ill.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
● Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Rheem Mfg. Co., San Francisco, Calif.
● Spencer Heater Div., Avco Mfg. Corp., Williamsport, Pa.
Terre Haute Boiler Works, Co., Terre Haute, Ind.

HEATING BOILERS

See Boilers, Heating

HEATING COILS

See Surface, Heating

HEATING SURFACE

See Surface, Heating

HOSE CLAMPS

See Clamps, Hose

HOSE, METAL, AND FITTINGS

Aeroquip Corp., Jackson, Mich.
American Metal Hose Branch, The, American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
Bendix Aviation Corp., Eclipse—Pioneer Div., Metal Hose Dept., Teterboro, N. J.
Brockway Co., Naugatuck, Conn.
Chicago Metal Hose Corp., Maywood, Ill.
Everhot Products Co., Chicago, Ill.
Gates Engineering Co., Wilmington, Del.
Packless Metal Products Corp., New Rochelle, N. Y.
Penflex Sales Co., Div. of Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Seamlex Co., Inc., Long Island City, N. Y.
Titeflex, Inc., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.
Zallea Brothers & Johnson, Wilmington, Del.

HOSE, NON-METAL, AND FITTINGS

Aeroquip Corp., Jackson, Mich.
American Ventilating Hose Co., New York, N. Y.
Boston Woven Hose & Rubber Co., Boston, Mass.
Continental Rubber Works, Erie, Pa.
DeVilbiss Co., The, Toledo, O.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Independent Pneumatic Tool Co., Chicago, Ill.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber and Tire Corp., Youngstown, O.
Resistoflex Corp., Belleville, N. J.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Warner Bros. Co., Spiratube Div., Bridgeport, Conn.

HOT WATER HEATING SYSTEMS

See Systems, Heating, Hot Water

HOSE, VENTILATING

See Ducts and Duct Fittings, Prefabricated, Non-Metallic

HOT WATER HEATING SYSTEMS, BALANCING ELBOWS FOR

See Elbows, Balancing, for Hot Water Heating System

HOT WATER PRESSURE REGULATORS

See Regulators, Pressure, Hot Water Heating Systems

HOUSINGS, FAN, CENTRIFUGAL

(Housing only—not complete fans)

● Bishop & Babcock Mfg. Co., Cleveland, O.
Brundage Co., The, Kalamazoo, Mich.
Circulator & Devices Mfg. Corp., New York, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Commercial Shearing & Stamping Co.,Youngstown, O.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Detroit Stamping Co., Detroit, Mich.
Garden City Fan Co., Chicago, Ill.
Gates Engineering Co., Wilmington, Del.
● Hastings Air Conditioning Co., Hastings, Neb.
Johnson Fan & Blower Co., Chicago, Ill.
Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago., Ill.
National Mfg. & Engineering Co., Detroit, Mich.
Northern Blower Co., Cleveland, O.
Power Engineering Co., Chicago, Ill.
SKF Industries, Inc., Philadelphia, Pa.
Sandberg Sheet Metal Works, Portland, Ore.
Schwitzer-Cummins Co., Indianapolis, Ind.
● United States Air Conditioning Corp., Minneapolis, Minn.
Utica Products, Inc., Utica, N. Y.

HOUSINGS, FAN, PROPELLER

(Housings only—not complete fans)

Circulators & Devices Mfg. Corp., New York, N. Y.
Commercial Shearing & Stamping Co., Youngstown, O.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Gates Engineering Co., Wilmington, Del.
Schwitzer-Cummins Co., Indianapolis, Ind.

HUMIDIFIERS, CENTRAL PLANT

● Air & Refrigeration Corp., New York, N. Y.
American Blower Corp., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
Annis Air Filters, Glendale, Calif.
● Armstrong Machine Wks., Three Rivers, Mich.
Bahnson Co., Winston-Salem, N. C.
● Barber-Colman Co., Rockford, Ill.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Cleveland Humidifier Co., Cleveland, O.
Farr Co., Los Angeles, Calif.
● Johnson Service Co., Milwaukee, Wis.
● McDonnell & Miller, Inc., Chicago, Ill.
Mellish & Murray Co., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Engineering & Mfg. Co., Kansas City, Mo.
Parks-Cramer Co., Fitchburg, Mass.
Powers Regulator Co., Chicago, Ill.
Skuttle Mfg. Co., Detroit, Mich.
Steamaire Co., Cincinnati, O.
● Surface Combustion Corp., Toledo, O.
● Trane Co., The, LaCrosse, Wis.
Viking Air Conditioning Corp., Cleveland, O.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.
● York Corp., York, Pa.

HUMIDIFIERS, DIRECT, SPRAY HEAD

American Moistening Co., Providence, R. I.
Anetsberger Bros., Chicago, Ill.
● Armstrong Machine Works, Three Rivers, Mich.
Bahnson Co., Winston-Salem, N. C. (Centrifugal).
Binks Mfg. Co., Chicago, Ill.
Blower Application Co., Milwaukee, Wis.
● Buffalo Forge Co., Buffalo, N. Y.
Drying Systems, Inc., Chicago, Ill.
● Grinnell Co., Inc., Providence, R. I.
International Moistening Co., Providence, R. I.
● Maid-O'Mist, Inc., Chicago, Ill.
Manufacturers Machine Co., North Andover, Mass.
● Marley Co., Inc., The, Kansas City, Kans.
● Murray Mfg. Co., D. J., Wausau, Wis.
New York Blower Co., Chicago, Ill.
Parks-Cramer Co., Fitchburg, Mass.
Pfening Co., Fred D., Columbus, O.
Rhode Island Humidifier & Ventilating Co., Boston, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Somers, Inc., H. J., Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Chicago, Ill.
Steamaire Co., Cincinnati, O.
Supreme Electric Products Corp., Rochester, N. Y.
● Trane Co., The, LaCrosse, Wis.
● Utility Appliance Corp., Los Angeles, Calif.
Water Cooling Corp., New York, N. Y.

HUMIDIFIERS FOR RADIATORS AND CONVECTORS

Bridgeport Brass Co., Bridgeport, Conn.
● Maid-O'-Mist, Inc., Chicago, Ill.
Patent Novelty Co., Fulton, Ill.
Skilbeck Mfg. Co., Kenosha, Wis.
Techtmann Industries, Inc., Milwaukee, Wis.

HUMIDIFIERS, RADIATOR VENT VALVE

● Maid-O'-Mist, Inc., Chicago, Ill.
Skilbeck Mfg. Co., Kenosha, Wis.

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HUMIDIFIERS, UNIT, ROOM TYPE (Without Heating)

● Carrier Corp., Syracuse, N. Y.
Fresh'nd-Aire Co., Div. of Cory Corp., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Lion Mfg. Corp., Chicago, Ill.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Engineering & Mfg. Co., Kansas City, Mo.
Norwood Filtration Co., The, Florence, Mass.
Somers, Inc., H. J., Detroit, Mich.
● Spraying Systems Co., Chicago, Ill.
Standard Engineering Wks., Pawtucket, R. I.
Steamaire Co., Cincinnati, O.
Tenney Engineering, Inc., Newark, N. J.
● United States Air Conditioning Corp., Minneapolis, Minn.
Water Cooling Corp., New York, N. Y.

HUMIDIFYING RADIATORS

See Radiators, Humidifying

HUMIDISTATS

American Moistening Co., Providence, R. I.
● Autempco Corp., New York, N. Y.
Bahnson Co., Winston-Salem, N. C.
● Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
H-B Instrument Co., Philadelphia, Pa.
● Johnson Service Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Parks-Cramer Co., Fitchburg, Mass.
● Penn Electric Switch Co., Goshen, Ind.
Powers Regulator Co., Chicago, Ill.
Standard Engineering Wks., Pawtucket, R. I.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
● White-Rodgers Electric Co., St. Louis, Mo.

HUMIDITY RECORDERS

See Recorders, Humidity

HUMIDITY AND TEMPERATURE CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

HYDRAULIC PIPE PUSHERS

See Pushers, Pipe, Hydraulic

HYDRAULIC SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling

HYGROMETERS

American Instrument Co., Silver Spring, Md.
American Moistening Co., Providence, R. I.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Fee and Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
General Scientific Equipment Co., Philadelphia, Pa.
Gotham Instrument Co., Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon, Chicago, Ill.
International Moistening Co., Providence, R. I.
● Johnson Service Co., Milwaukee, Wis.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Co. Cincinnati (Norwood), O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Wallace & Tiernan Co., Inc., Newark, N. J.
Weksler Thermometer Corp., New York, N. Y.
● Weston Electrical Instrument Corp., Newark, N. J.

HYGROSTATS

See Humidistats

IDENTIFICATION MARKERS (For Piping Services)

Western Lithograph Co., Los Angeles, Calif.

IMMERSION THERMOSTATS

See Thermostats, Immersion

INDICATING THERMOMETERS

See Thermometers, Indicating

INDICATOR-CONTROLLERS, PRESSURE

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Re
Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark., Palmyra, N. J.
Electro Products Laboratories, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Inc., New York, N. Y.
● Hays Corp., Michigan City, Ind.
● Illinois Engineering Co., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

INDICATOR-CONTROLLERS, RELATIVE HUMIDITY

American Instrument Co., Silver Spring, Md.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
● Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div., Minneapolis-Honeywell Reg
Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Inc., New York, N. Y.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N.
Taylor Instrument Companies, Rochester, N. Y.

INDICATOR-CONTROLLERS, TEMPERATURE

American Instrument Co., Silver Spring, Md.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. Minneapolis-Honeywell Reg
Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Inc., New York, N. Y.
● Illinois Engineering Co., Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Chicago, Ill.
Pyrometer Instrument Co., New York, N. Y.
● Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Wheelco Instruments Co., Chicago, Ill.

INDICATORS, CARBON DIOXIDE, BOILER ROOM

For Portable CO_2 Analyzers, See Analyzers, Carbon Dioxide, P

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Davis Emergency Equipment Co., Newark, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engelhard, Inc., Chas., Newark, N. J.
Ess Instrument Co., Bergenfield, N. J.
● Hays Corp., Michigan City, Ind.
Leeds & Northrup Co., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Weaver Mfg. Co., Springfield, Ill.

INDICATORS, DEW POINT

Foxboro Co., Foxboro, Mass.
● Illinois Testing Laboratories, Inc., Chicago, Ill.

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INDICATORS, FLOW

See Meters, Flow

INDICATORS, LIQUID LEVEL

- Automatic Control Co., St. Paul, Minn.
- Automatic Temperature Control Co., Inc., Philadelphia, Pa.
- Bailey Co., Chas. M., San Francisco, Calif.
- Bailey Meter Co., Cleveland, O.
- Barton Instrument Co., Los Angeles, Calif.
- Boston Auto Gage Co., Pittsfield, Mass.
- Bristol Co., The, Waterbury, Conn.
- Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
- ● Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
- Cook Electric Co., Diaphlex Div., Chicago, Ill.
- Cooper Co., Clark, Palmyra, N. J.
- Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
- Foxboro Co., Foxboro, Mass.
- ● Hays Corp., Michigan City, Ind.
- Healy Ruff Co., St. Paul, Minn.
- ● Henry Valve Co., Chicago, Ill.
- Mason-Neilan Regulator Co., Boston, Mass.
- ● McDonnell & Miller, Inc., Chicago, Ill.
- Meriam Instrument Co., The, Cleveland, O.
- Moore Products Co., Philadelphia, Pa.
- Petrometer Corp., Long Island City, N. Y.
- Rochester Mfg. Co., Inc., Rochester, N. Y.
- ● Stephens-Adamson Mfg. Co., Aurora, Ill.
- Swift Lubricator Co., Elmira, N. Y.
- Taylor Instrument Companies, Rochester, N. Y.
- Trimount Instrument Co., Chicago, Ill.
- Uehling Instrument Co., Paterson, N. J.
- Wallace & Tiernan Co., Inc., Newark, N. J.
- Weatherhead Co., Cleveland, O.
- United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
- ● Yarnall-Waring Co., Philadelphia, Pa.

INDICATORS, SOUND LEVEL

- General Electric Co., Apparatus Dept., Schenectady, N. Y.

INDIRECT HEATING SURFACE

See Surface, Heating

INDIRECT WATER HEATERS

See Heaters, Water, Indirect

INDUSTRIAL AIR CONDITIONERS

See Units, Air Conditioning, Industrial Type

INDUSTRIAL DRYERS

See Dryers, Industrial

INJECTOR RECIRCULATORS FOR REFRIGERANTS

- Phillips & Co., H. A., Chicago, Ill.

INSERTS, CONDENSER TUBE

- Condenser Service & Engineering Co., Inc., Hoboken, N. J.

INSTANTANEOUS WATER HEATERS

See Heaters, Water, Steam, Instantaneous

INSULATION, BOILER AND TANK

- Acme Asbestos Covering & Flooring Co., Chicago, Ill.
- Alfol Insulation Co., Inc., New York, N. Y. (Aluminum foil)
- Alton Mineral Wool Insulation Co., St. Louis, Mo.
- Armstrong Cork Co., Lancaster, Pa. (85% Magnesia)
- Badham Insulation Co., Inc., Birmingham, Ala.
- Baldwin-Hill Co., Trenton, N. J. (Rock wool)
- Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
- Bird-Archer Co., Philadelphia, Pa.
- Botfield Refractories Co., Philadelphia, Pa.
- Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
- Cork Import Corp., Englewood, N. J. (Cork, mineral wool board)
- Cork Insulation Co., Inc., New York, N. Y. (Cork)
- Eagle-Picher Co., Cincinnati, O.
- Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Magnesia)
- ● Grant Wilson, Inc., Chicago, Ill.
- Green Fire Brick Co., A. P., Mexico, Mo.
- International Vermiculite Co., Girard, Ill.
- Jamar Co., Walker, Duluth, Minn.
- ● Johns-Manville, New York, N. Y.
- Keasbey Co., Robert A., New York, N. Y. (Asbestos)
- Keasbey & Mattison Co., Ambler, Pa.
- Krehbiel Co., J. H., Chicago, Ill.
- Laclede-Christy Clay Products Co., St. Louis, Mo.
- ● Mundet Cork Corp., North Bergen, N. J. (Cork)
- Munn and Steel, Inc., Newark, N. J.
- National Gypsum Co., Buffalo, N. Y. (Rock wool)
- Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos and magnesia)
- ● Owens-Corning Fiberglas Corp., Toledo, O. (Blanket)
- Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
- Pittsburgh Corning Corp., Pittsburgh, Pa.
- Pittsburgh Plate Glass Co., Pittsburgh, Pa.
- Plibrico Jointless Firebrick Co., Chicago, Ill.
- Plant Rubber & Asbestos Works, San Francisco, Calif.
- Poe Co., C. W., Cleveland, O.
- Quigley Co., Inc., New York, N. Y.
- Refractory & Insulation Corp., New York, N. Y. (Blanket, block, cement)
- ● Reynolds Metals Co., Richmond, Va.
- Robinson Insulation Co., Great Falls, Mont.
- Rock Fleece Co., El Paso, Tex.
- Ruberoid Co., New York, N. Y. (Asbestos, magnesia)
- Sall Mountain Co., Chicago, Ill.
- Schundler & Co., Inc., F. E., Long Island City, N. Y.
- Smith & Kanzler Corp., Linden, N. J.
- Standard Asbestos Mfg. Co., Chicago, Ill.
- Standard Fuel Engineering Co., Detroit, Mich.
- Telsit Insulation Co., Bronx, N. Y.
- Tennessee Products and Chemical Corp., Nashville, Tenn.
- Union Asbestos & Rubber Co., Cicero, Ill.
- United Cork Co., Kearny, N. J. (Cork)
- United States Mineral Wool Co., South Milwaukee, Wis.
- Universial Zonolite Insulation Co., Chicago, Ill. (Plastic)
- Walker Jamar Co., Duluth, Minn.
- Western Mineral Products Co., Omaha, Neb.
- ● Wilson, Inc., Grant, Chicago, Ill.

INSULATION, BUILDING

- Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Rock wool)
- Alfol Insulation Co., Inc., New York, N. Y., (Aluminum foil)
- Alton Mineral Wool Insulation Co., St. Louis, Mo.
- ● Aluminum Co. of America, Pittsburgh, Pa.
- American Flange & Mfg. Co., Inc., New York, N. Y. (Metal sheets)
- American Hair & Felt Co., Chicago, Ill. (Hair felt)
- Armstrong Cork Co., Lancaster, Pa. (Corkboard, fibre board)
- Bache & Co., Semon, New York, N. Y. (Glass wool)
- Badham Insulation Co., Inc., Birmingham, Ala.
- Baldwin-Hill Co., Trenton, N. J. (Rock wool)
- Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
- Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Rock wool)
- Carney Co., Inc., The, Mankato, Minn.
- Celotex Corp., The, Chicago, Ill.
- Certain-teed Products Corp., Chicago, Ill. (Board, reflective)
- Chamberlin Co. of America, Detroit, Mich. (Rock wool)
- Cork Import Corp., Englewood, N. J. (Cork, mineral wool board)
- Cork Insulation Co., Inc., New York, N. Y. (Corkboard)
- Doheny Co., John J., Belmont, Mass. (Blanket)
- Dry-Zero Corp., Chicago, Ill.
- Eagle-Picher Co., Cincinnati, O. (Mineral wool, blankets, batts, granulated, loose)
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Fir-Tex Insulating Board Co., St. Helens, Ore. (Wood fibre-board)
- Flintkote Co., The, New York, N. Y. (Glass wool)
- General Insulating Products Co., Brooklyn, N. Y. (Rock wool)
- ● Grant Wilson, Inc., Chicago, Ill. (Rockwool)
- Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn. (Wool fibre)
- Insul-Wool Insulation Corp., Wichita, Kans.
- International Vermiculite Co., Girard, Ill. (Loose fill)
- ● Johns-Manville, New York, N. Y. (Rock wool and wood fibre-board)
- Johnston Tin Foil & Metal Co., St. Louis, Mo. (Foil, aluminum, tin, lead)
- Keasbey Co., Robert A., New York, N. Y. (Rock wool)
- Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
- Kimberly-Clark Corp., Neenah, Wis.
- Masonite Corp., Cellufoam Products Div., Chicago, Ill. (Blanket)
- Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
- Multi-Cell Sales Corp., Minneapolis, Minn. (Blanket, quilted newspaper)
- ● Mundet Cork Corp., North Bergen, N. J. (Cork)
- Munn & Steel, Inc., Newark, N. J.
- National Gypsum Co., Buffalo, N. Y.
- Nelson Mfg. Co., B. F., Minneapolis, Minn.
- ● Owens-Corning Fiberglas Corp., Toledo, O.
- Pacific Lumber Co., The, San Francisco, Calif.
- Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
- Pittsburgh Corning Corp., Pittsburgh, Pa.
- Pittsburgh Plate Glass Co., Pittsburgh, Pa.
- Plant Rubber & Asbestos Works, San Francisco, Calif.
- Plastergon Wall Board Co., Buffalo, N. Y. (Rigid board)
- Poe Co., C. W., Cleveland, O.
- Refractory & Insulation Corp., New York, N. Y. (Rock, slag wool)
- ● Reynolds Metals Co., Richmond, Va.
- Robinson Insulation Co., Great Falls, Mont.
- Rock Fleece Co., El Paso, Tex.
- Ruberoid Co., New York, N. Y. (Mineral wool)
- Russell Co., F. C., The, Cleveland, O.
- Semon Bache & Co., New York, N. Y. (Glass wool)
- Silvercote Products, Inc., Chicago, Ill.
- Specialty Converters, Inc., East Braintree, Mass. (Reflective Insulation)
- Sprayo-Flake Co., Chicago, Ill.
- Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hairfelt)
- Standard Lime & Stone Co., Baltimore, Md. (Rock wool)
- ● Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)
- Tennessee Products and Chemical Corp., Nashville, Tenn.
- Truscon Steel Co., Youngstown, O. (Insulation board sealed between metal sheets)
- United Cork Companies, Lyndhurst, N. J. (Cork)
- United States Gypsum Co., Chicago, Ill. (Wool and board)
- United States Mineral Wool Co., South Milwaukee, Wis. (Mineral wool)
- Universal Gypsum & Lime Co., Chicago, Ill. (Loose fill)

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Universal Zonolite Insulation Co., Chicago, Ill. (Loose fill)
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Western Mineral Products Co., Omaha, Neb.
● Wilson & Co., Inc., Chicago, Ill. (Board)
● Wilson, Inc., Grant, Chicago, Ill. (Rock wool)
Wood Conversion Co., St. Paul, Minn.

INSULATION, CEILING AND WALL, SOUND DEADENING

Acoustical Treatment Only—for Thermal Insulation, See Insulation, Building

Alton Mineral Wool Insulation Co., St. Louis, Mo.
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Baldwin-Hill Co., Trenton, N. J.
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Celotex Corp., The, Chicago, Ill.
Certain-teed Products Corp., Chicago, Ill.
Doheny Co., John J., Belmont, Mass.
Felters Company, The, Boston, Mass.
Fir-Tex Insulating Board Co., St. Helens, Ore.
General Insulating Products Co., Brooklyn, N. Y.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn.
Insul-Wool Insulation Corp., Wichita, Kans.
Inter-Coastal Paint Corp., East St. Louis, Ill.
● Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Masonite Corp., Chicago, Ill. (Fibreboard)
● Mundet Cork Corp., North Bergen, N. J.
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
● Owens-Corning Fiberglas Corp., Toledo, O.
Pacific Lumber Co., The, San Francisco, Calif.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
● Reynolds Metals Co., Richmond, Va.
Robinson Insulation Co., Great Falls, Mont.
Sprayo-Flake Co., Chicago, Ill.
Technical Ply-Woods, Chicago, Ill.
United States Gypsum Co., Chicago, Ill.
Universal Zonolite Insulation Co., Chicago, Ill.
Western Mineral Products Co., Omaha, Neb.
Wood Conversion Co., St. Paul, Minn.

INSULATION, DRAIN TRAP

● Grant Wilson, Inc., Chicago, Ill.
● Wilson, Inc., Grant, Chicago, Ill.

INSULATION, DUCT, SOUND DEADENING

For Application Inside Duct

American Hair & Felt Co., Chicago, Ill.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Celotex Corp., The, Chicago, Ill.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felters Company, The, Boston, Mass.
● Grant Wilson, Inc., Chicago, Ill.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn.
● Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Kimberly-Clark Corp., Neenah, Wis.
Moore Co., Goodloe E., Danville, Ill.
Mortell Co., J. W., Kankakee, Ill.
● Owens-Corning Fiberglas Corp., Toledo, O.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
● Reynolds Metals Co., Richmond, Va.
Robinson Insulation Co., Great Falls, Mont.
● Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)
Telsit Insulation Co., Bronx, N. Y.
United States Rubber Co., New York, N. Y.
Universal Zonolite Insulation Co., Chicago, Ill.
Western Felt Works, Chicago, Ill.
● Wilson, Inc., Grant, Chicago, Ill.

INSULATION, DUCT, THERMAL

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Asbestos)
Alfol Insulation Co., Inc., New York, N. Y. (Aluminum foil)
American Flange & Mfg. Co., Inc., New York, N. Y. (Metal sheets)
American Hair & Felt Co., Chicago, Ill. (Hair felt)
Armstrong Cork Co., Lancaster, Pa. (Corkboard)
Arrowhead Rubber Co., Los Angeles, Calif.
Baldwin-Hill Co., Trenton, N. J.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Asbestos)
Celotex Corp., The, Chicago, Ill.
Cork Import Corp., Englewood, N. J. (Cork, mineral wool board)
Cork Insulation Co., Inc., New York, N. Y. (Cork board)
Dry-Zero Corp., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O. (Mineral wool blankets)
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Cork, magnesia, hair felt)
Felters Company, The, Boston, Mass. (Wool felt)
Fir-Tex Insulating Board Co., St. Helens, Ore. (Wood fibreboard)
General Insulating Products Co., Brooklyn, N. Y. (Acoustic rock wool)
● Grant Wilson, Inc., Chicago, Ill.
Hinde & Dauch Paper Co., Sandusky, O.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn. (Wood fibre)
International Vermiculite Co., Girard, Ill. (Block)
● Johns-Manville, New York, N. Y. (Rock cork, asbestos)
Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Keystone Asphalt Products Co., Chicago, Ill.
Kimberly-Clark Corp., Neenah, Wis.
Masonite Corp., Chicago, Ill.
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Mortell Co., J. W., Kankakee, Ill.
● Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steele, Inc., Newark, N. J.
National Gypsum Co., Buffalo, N. Y. (Block)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos and wool felt)
● Owens-Corning Fiberglas Corp., Toledo, O. (Blanket)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y. (Block, blanket)
● Reynolds Metals Co., Richmond, Va.
Robinson Insulation Co., Great Falls, Mont.
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y. (Asbestos cellular and laminated sheets or blocks)
Sall Mountain Co., Chicago, Ill. (Asbestos)
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J. (Asbestos air cell type)
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hair felt)
● Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)
Telsit Insulation Co., Bronx, N. Y.
United Cork Companies, Lyndhurst, N. J. (Cork)
United States Mineral Wool Co., South Milwaukee, Wis.
Universal Zonolite Insulation Co., Chicago, Ill. (Plastic)
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Western Felt Wks., Chicago, Ill. (Felt)
● Wilson & Co., Inc., Chicago, Ill. (Flexible)
● Wilson, Inc., Grant, Chicago, Ill.
Wood Conversion Co., St. Paul, Minn.

INSULATION, PIPE

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alfol Insulation Co., Inc., New York, N. Y. (Aluminum foil)
● American District Steam Co., North Tonawanda, N. Y. (Underground)
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa. (Cork)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., The, Allied Chemical & Dye Corp., New York, N. Y.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Asbestos, magnesia)
Cork Import Corp., Engelwood, N. J. (Cork)
Cork Insulation Co., New York, N. Y.
● Durant Insulated Pipe Co., Palto Alto, Calif. (Underground)
Eagle-Picher Co., Cincinnati, O. (Mineral wool)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
General Electric Co., Chemical Dept., Pittsfield, Mass.
● Grant Wilson, Inc., Chicago, Ill.
International Vermiculite Co., Girard, Ill. (Vermiculite)
Jamar Co., Walker, Duluth, Minn.
● Johns-Manville, New York, N. Y. (Asbestos, magnesia, rock cork)
Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos, magnesia)
Masonite Corp., Chicago, Ill.
Monsanto Chemical Co., Merimac Div., Everett, Mass.
Mortell Co., J. W., Kankakee, Ill.
● Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steele, Inc., Newark, N. J.
Mystik Adhesive Products Div., Chicago Show Printing Co., Chicago, Ill.
National Gypsum Co., Buffalo, N. Y. (Moulded)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos, magnesia)
● Owens-Corning Fiberglas Corp., Toledo, O. (Sectional and flexible)
Pacific States Felt Mfg. Co., Inc., San Francisco, Calif.
Paraffine Companies, Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Poe Co., C. W., Cleveland, O.
● Porter & Co., Inc., H. W., Newark, N. J. (Underground)
Quigley Co., Inc., New York, N. Y.
● Ric-wiL Co., Cleveland, O. (Underground)
Robinson Insulation Co., Great Falls, Mont.
Rock Fleece Co., El Paso, Tex.
Ruberoid Co., New York, N. Y. (Asbestos, magnesia, calsilite)
Sall Mountain Co., Chicago, Ill. (Asbestos and wool felt)
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J. (Asbestos air cell, wool felt and hair felt)

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Standard Asbestos Mfg. Co., Chicago, Ill.
Union Asbestos & Rubber Co., Cicero, Ill.
United Cork Companies, Lyndhurst, N. J.
Universal Zonolite Insulation Co., Chicago, Ill.
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Walker Jamar Co., Duluth, Minn.
Western Mineral Products Co., Omaha, Neb. (Underground)
● Wilson, Inc., Grant, Chicago, Ill.
Wyckoff & Son Co., A., Elmira, N. Y. (Wood)

IONIZATION APPARATUS

Coroaire Heater Corp., The, Cleveland, O.
General Ozone Corp., Chicago, Ill.
Montgomery Bros., San Francisco, Calif.
Norwood Filtration Co., The, Florence, Mass.
United States Ozone Co. of America, Scottdale, Pa.

IRON BODY VALVES

See Valves, Gate; and Valves, Globe

JACKETED PIPE

See Pipe, Jacketed

JOINTS, PIPE, ELECTRICAL INSULATING

Barco Mfg. Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.

JOINTS, PIPE, EXPANSION, PACKLESS

● American District Steam Co., North Tonawanda, N. Y.
Badger Fire Extinguisher Co., Somerville, Mass.
● Badger & Sons Co., E. B., Cambridge Div., Cambridge, Mass. (Corrugated copper, stainless steel)
Barco Mfg. Co., Chicago, Ill.
Belfield Co., H., Philadelphia, Pa.
Chicago Metal Hose Corp., Maywood, Ill.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
Foster Wheeler Corp., New York, N. Y.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Harris & Co., Arthur, Chicago, Ill.
Kopperman & Sons, Joseph, Philadelphia, Pa.
MagniLastic Div., Cook Electric Co., Chicago, Ill.
National Valve & Mfg. Co., Pittsburgh, Pa.
Northern Indiana Brass Co., Elkhart, Ind.
Semet-Solvay Engineering Corp., New York, N. Y.
United States Rubber Co., New York, N. Y.
Zallea Brothers & Johnson, Wilmington, Del.

JOINTS, PIPE, EXPANSION, SLIP

● American District Steam Co., North Tonawanda, N. Y.
Belfield Co., H., Philadelphia, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Clow & Sons, James B., Chicago, Ill.
● Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Howard Iron Works & Alberger Heater Co., Buffalo, N. Y.
● Illinois Engineering Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Northern Indiana Brass Co., Elkhart, Ind.
Powell Co., Wm., Cincinnati, O.
Q-P Mfg. Co., Needham Heights, Mass.
● Ric-wiL Co., Cleveland, O.
Schade Valve Mfg. Co., Philadelphia, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
● Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.
● Yarnall-Waring Co., Philadelphia, Pa.

JOINTS, PIPE, FLEXIBLE SWING AND REVOLVING

Barco Mfg. Co., Chicago, Ill.
Bordo Co., Inc., L. J., Glenside, Pa.
Chiksan Co., Brea, Calif.
Flexo Supply Co., Inc., St. Louis, Mo.
● Johnson Corp., The, Three Rivers, Mich.
Moran Flexible Joint Co., Inc., Louisville, Ky.
Patterson-Ballagh Corp., Los Angeles, Calif.
Powell Co., Wm., Cincinnati, O.
Snyder Sales Corp., Los Angeles, Calif.
● Spraying Systems Co., Chicago, Ill.
Water Cooling Corp., New York, N. Y.

JOINTS, UNIVERSAL, FOR OPERATING VALVES

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blood Brothers Machine Co., Allegan, Mich.
Brooks Equipment Corp., Hoboken, N. J.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Piezo Mfg. Corp., New York, N. Y.
Stow Mfg. Co., Binghamton, N. Y. (flexible shafts)

KATA THERMOMETERS

See Thermometers, Kata

LACQUERS

See Enamels and Lacquers

LAGGING ADHESIVES

See Adhesives, for Pipe Covering

LAMPS, STERILIZING, FOR DUCT INSTALLATION

General Electric Co., Lamp Dept., Nela Park, Cleveland, O.
Hanovia Chemical & Mfg. Co., Newark, N. J.
Lustra Corp. of America, New York, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.

LEAD PIPE

See Pipe and Tubing, Lead and Lead Alloy

LEAD SHEETS

See Sheets, Lead

LEAD TUBING

See Pipe and Tubing, Lead and Lead Alloy

LEAK DETECTORS

See Detectors, Leak, Refrigerant

LEATHER BELTING

See Belting, Flat, Leather

LEATHER PACKING

See Packing, Leather

LIGHTS, PILOT AND SIGNAL

Armstrong Control Co., Inc., Portland, Ore.
Cooper Co., Clark, Palmyra, N. J.
Dial Light Co. of America, Inc., New York, N. Y.
● General Controls Co., Glendale, Calif.
General Electric Co., Lamp Dept., Nela Park, Cleveland, O.
Hart Mfg. Co., The, Hartford, Conn.
Signal Indicator Co., New York, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.

LINKS, FUSIBLE

● Grinnell Co., Inc., Providence, R. I.
Morse-Smith-Morse, Inc., Watertown, Mass.
Preferred Utilities Mfg. Corp., New York, N. Y.

LIQUID LEVEL GAGES

See Gages, Liquid Level

LIQUID LEVEL INDICATORS

See Indicators, Liquid Level

LIQUID LEVEL RECORDERS

See Recorders, Liquid Level

LIQUID LEVEL REGULATORS

See Regulators, Liquid Level

LIQUID PRESSURE REGULATORS

See Regulators, Pressure, Liquid

LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

LOCK NUTS

See Nuts, Lock

LOUVERS AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED

● Air Conditioning Products Co., Detroit, Mich.
Air Control Products, Inc., Coopersville, Mich.
Airmaster Corp., Chicago, Ill.
American Coolair Corp., Jacksonville, Fla.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.

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Arex Co., Chicago, Ill.
B & B Tool & Specialty Co., The, Dayton, O.
● Barber-Colman Co., Rockford, Ill.
Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Biersach & Niedermeyer Co., Milwaukee, Wis.
● Bishop & Babcock Mfg. Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
Burt Mfg. Co., Akron, O.
Campbell Heating Co., E. K., Kansas City, Mo.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Circulators & Devices Mfg. Corp., New York, N. Y.
Clay Equipment Corp., Cedar Falls, Ia.
Conoflow Corp., Philadelphia, Pa.
Dana Fan & Blower Corp., Cincinnati, O.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., Decatur, Ala.
Dual Air Fan Co., Chicago, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Elgo Shutter & Mfg. Co., Detroit, Mich.
● Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
International Steel Co., Evansville, Ind.
Jamieson Mfg. Co., Dallas, Tex.
Johnson Fan & Blower Corp., Chicago, Ill.
Jordan & Co., Paul R., Indianapolis, Ind.
Kelvin-White Co. Boston, Mass.
King Co., The, Owatonna, Minn.
Lau Blower Co., Dayton, O.
Lockjoint Wood Products Co., Wichita, Kans. (Wood; stationary door, wall, window and ceiling)
Martin Fan & Blower Co., Chicago, Ill.
Maysteel Products, Inc., Milwaukee, Wis.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Meyer Mfg. Co., Detroit, Mich.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Meyers Electric Co., Inc., Pittsburgh, Pa.
● Nelson Corp., Herman, Moline, Ill.
Peerless Electric Co., Warren, O.
Production Planning Co., Rochester, Mich.
Reed Unit-Fans, Inc., New Orleans, La.
Richmond Fireproof Door Co., Richmond, Ind.
Riggin Metal Products, Inc., Kankakee, Ill.
Robertson Co., H. H., Pittsburgh, Pa.
Schoedinger, F. O., Columbus, O.
Shallcross Controls, Inc., Milwaukee, Wis.
Signal Electric Mfg. Co., Menominee, Mich.
Sioux Steel Co., Sioux Falls, S. D.
Southbridge Roofing Co., Inc., Southbridge, Mass.
● Standard Stamping & Perforating Co., Chicago, Ill.
● Swartwout Co., Cleveland, O.
● Tuttle & Bailey, Inc., New Britain, Conn.
United States Gypsum Co., Chicago, Ill.
United States Register Co., Battle Creek, Mich.
● Utility Appliance Corp., Los Angeles, Calif.
Van Noorden Co., E., Boston, Mass.
Victor Electric Products, Inc., Cincinnati, O.

LOW WATER CUT-OFFS

See Cut-Offs, Low Water, Heating Boiler

MACHINES, BALANCING

See Equipment, Balancing

MACHINES, BLUE PRINT AND WHITE PRINT

For Reproducing Engineering Drawings

American Photocopy Equipment Co., Chicago, Ill.
Bruning Co., Inc., Charles, Long Island City, N. Y.
Dietzgen Co., Eugene, Chicago, Ill.
Ozalid Products Div., General Aniline & Film Corp., Johnson City, N. Y.
Paragon-Revolute Corp., Rochester, N. Y.
Pease Co., C. F., The, Chicago, Ill.
Peck & Harvey, Chicago, Ill.
Wickes Brothers, Saginaw, Mich.

MACHINES AND FILM, X-RAY

Eastman Kodak Co., Rochester, N. Y.
Kelley Koett Mfg. Co., The, Covington, Ky.
North American Philips Co., Inc., New York, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.

MACHINES, FLANGING, PIPE AND TUBE

Leonard Precision Products Co., Garden Grove, Calif.

MACHINES, FLARING, PIPE AND TUBE

Leonard Precision Products Co., Garden Grove, Calif.

MACHINES, PIPE CLEANING

Continental Machine Co., Chicago, Ill.
Spartan Tool Co., Chicago, Ill.

MACHINES, PIPE CUTTING AND THREADING, PORTABLE

Air Reduction Sales Co., New York, N. Y. (Cutting and beveling)
American Die & Tool Co., Inc., Reading, Pa.
Beaver Pipe Tools, Inc., Warren, O.
Century Engineering Co., Los Angeles, Calif.
Curtis & Curtis Co., The, Bridgeport, Conn.
Landis Machine Co., Inc., Waynesboro, Pa.
National Machine Works, Chicago, Ill.
Nye Tool & Machine Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Quijada Tool Co., Inc., Los Angeles, Calif.
● Ridge Tool Co., Elyria, O. (Hand)
Toledo Pipe Threading Machine Co., Toledo, O.

MACHINES, PIPE CUTTING AND THREADING, STATIONARY

Bignall & Keeler Machine Wks., Edwardsville, Ill.
Curtis & Curtis Co., The, Bridgeport, Conn.
Jarecki Mfg. Co., Erie, Pa.
Landis Machine Co., Inc., Waynesboro, Pa.
Obear, E. L., Los Angeles, Calif.
Oster Mfg. Co., Cleveland, O.
Pines Engineering Co., Inc., Aurora, Ill.
Saunders Machine & Tool Corp., Yonkers, N. Y.
Toledo Pipe Threading Machine Co., Toledo, O.

MACHINES, PITTSBURGH LOCK FORMING

Dahlstrom Machine Works, Chicago, Ill.
Lockformer Co., Chicago, Ill.
Maplewood Machinery Co., Inc., Chicago, Ill.
Rafter Machine Co., Inc., Belleville, N. J.
Whitney Metal Tool Co., Rockford, N. J.

MACHINES, REFRIGERATION, ABSORPTION

Vogt Machine Co., Henry, Louisville, Ky.
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
● York Corp., York, Pa.

MACHINES, TESTING, WELD

Air Reduction Sales Co., New York, N. Y.

MACHINES, VERTICAL, THREADING AND BORING

Bullard Co., The, Bridgeport, Conn.

MAGNESIUM ALLOY SHEETS

See Sheets, Magnesium Alloy

MAGNESIUM PIPE

See Pipe, Magnesium

MAGNESIUM TUBING

See Tubing, Magnesium

MALLEABLE UNIONS

See Unions, Malleable

MANIFOLDS, REFRIGERATION

Bell Welding Works, Inc., Oakland, Calif.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
● Frick Co., Waynesboro, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
Superior Valve and Fittings Co., Pittsburgh, Pa.
U. S. Pipe & Mfg. Co., San Francisco, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Weatherhead Co., Cleveland, O.
● York Corp., York, Pa.

MANOMETERS

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Barton Instrument Co., Los Angeles, Calif.

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Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
● Builders-Providence Co., Div. of Builders Iron Foundry, Providence, R. I.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
● Hays Corp., Michigan City, Ind.
Hill, E. Vernon, Chicago, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Meriam Instrument Co., The, Cleveland, O.
Precision Scientific Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Wallace & Tiernan Co., Inc., Newark, N. J.

MECHANICAL DRIVE TURBINES

See Turbines, Mechanical Drive

MECHANICAL SPEED CHANGERS

See Changers, Speed, Mechanical

MECHANICAL TRAPS

See Traps, Steam, Mechanical

MERCURY SWITCHES

See Switches, Mercury

METAL HOSE

See Hose, Metal and Fittings

METAL, POROUS, FOR FILTRATION, SEPARATION, DIFFUSION AND FLOW CONTROL

Keystone Carbon Co., Inc., St. Marys, Pa.
Moraine Products Div., General Motors Corp., Dayton, O.

METALLIC BELLOWS

See Bellows, Thermostatic and Metallic

METALLIC PACKING

See Packing, Metallic

METERS, AIR VELOCITY, DIRECT READING

Hastings Instrument Co., Hampton, Va.
● Hays Corp., Michigan City, Ind.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.

METERS, CONDENSATION

● American District Steam Co., North Tonawanda, N. Y.
Buffalo Meter Co., Buffalo, N. Y.
Central Station Steam Co., Detroit, Mich.
Neptune Meter Co., New York, N. Y.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.

METERS, FLOW, REFRIGERANT

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
● Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
● Hays Corp., Michigan City, Ind.
Moore Products Co., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Trimount Instrument Co., Chicago, Ill.

METERS, FLOW, STEAM

● American District Steam Co., North Tonawanda, N. Y.
American Meter Co., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
● Hagan Corp., Pittsburgh, Pa.
● Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Meriam Instrument Co., The, Cleveland, O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.

METERS, PROCESS LIQUID

American Meter Co., Inc., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles Calif.
Bowser, Inc., Fort Wayne, Ind.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Buffalo Meter Co., Buffalo, N. Y.
● Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Moore Products Co., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Republic Flow Meters Co., Chicago, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.
Schutte & Koerting Co., Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Worthington-Gamon Meter Co., Harrison, N. J.

METERS, VOLUME, AIR AND GAS

American Meter Co., Inc., New York, N. Y.
Bristol Co., The, Waterbury, Conn.
Fischer & Porter Co., Hatboro, Pa.
● Hays Corp., Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Schutte & Koerting Co., Philadelphia, Pa.
Selas Corp. of America, Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.

METERS, WATER

Bailey Meter Co., Cleveland, O.
Barton Instrument Co., Los Angeles, Calif.
Buffalo Meter Co., Buffalo, N. Y.
● Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Hersey Mfg. Co., South Boston, Mass.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
National Meter Co., Brooklyn, N. Y.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pfening Co., Fred D., Columbus, O. (batch measuring)
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Republic Flow Meters Co., Chicago, Ill.
Roots-Connersville Blower Corp., Connersville, Ind.
Schutte & Koerting Co., Philadelphia, Pa.
Union Water Meter Co., Worcester, Mass.
Worthington-Gamon Meter Co., Harrison, N. J.

MIXING VALVES

See Valves, Mixing, Steam and Water

MODULATING VALVES

See Valves, Radiator, Steam and Hot Water Modulating

MOTOR BASES

See Bases and Pads, Vibration Isolating; Bases, Motor Tension Adjusting

MOTOR CONTROLLERS

See Controllers and Starters, Motor

MOTOR OPERATED VALVES

See Valves, Motor Operated

MOTOR STARTERS

See Controllers and Starters, Motor

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MOTORS, ELECTRIC, FRACTIONAL HP

● Alliance Mfg. Co., Alliance, O. (Shaded pole)
Ampex Electric Corp., San Carlos, Calif.
● Baldor Electric Co., St. Louis, Mo.
● Barber-Colman Co., Rockford, Ill.
Bodine Electric Co., Chicago, Ill.
Brown-Brockmeyer Co., Dayton, O.
Brown Electric Co., Forest Hills, N. Y.
Burke Electric Co., Erie, Pa.
Canatsey Electric Mfg. Co., Kansas City, Mo.
Century Electric Co., St. Louis, Mo.
Crise Mfg. Co., The, Columbus, O.
Crozier Machine Tool Co., Hawthorne, Calif.
Dayton Acme Co., Cincinnati, O.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
● Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Somerville, N. J.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fairbanks, Morse & Co., Chicago, Ill.
Franklin Electric Co., Inc., Bluffton, Ind.
General Die and Stamping Co., New York, N. Y.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hansen Mfg. Co., Inc., Princeton, Ind.
Holtzer-Cabot, Div. First Industrial Corp., Boston, Mass.
Howell Electric Motors Co., Howell, Mich.
Jack & Heintz Precision Industries, Inc., Cleveland, O.
● Janette Mfg. Co., Chicago, Ill.
Lamb Electric Co., Kent, O.
Leland Electric Co., Dayton, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Master Electric Co., Dayton, O.
● Moore Co., The, Kansas City, Mo., (Slow speed fan motors)
Ohio Electric Mfg. Co., Cleveland, O.
Peerless Electric Co., Warren, O.
Piqua Machine & Mfg. Co., Piqua, O.
Portable Electric Tools, Inc., Chicago, Ill.
Power Engineering Co., Chicago, Ill.
Redmond Co., Inc., Owosso, Mich.
Reynolds Electric Co., Chicago, Ill.
Robbins & Myers, Inc., Springfield, O.
Rotor Corp., Miamisburg, O.
Royal Mfg. Corp., Waterloo, Ind.
● Russell Electric Co., Chicago, Ill.
Sawyer Electrical Mfg. Co., Los Angeles, Calif.
Signal Electric Mfg. Co., Menominee, Mich.
Smith Mfg. Co., Inc., F. A., Rochester, N. Y.
Speedway Mfg. Co., Chicago (Cicero), Ill.
Standard Motor Corp., Elyria, O.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Victor Electric Products, Inc., Cincinnati, O.
● Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whirlaway Motors, Inc., Tipp City, O.

MOTORS, ELECTRIC, 1 HP AND OVER

● Allis Co., Louis, The, Milwaukee, Wis.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
● Baldor Electric Co., St. Louis, Mo.
Bogue Electric Co., Paterson, N. J.
Brown-Brockmeyer Co., Dayton, O.
Brown Electric Co., Forest Hills, N. Y.
Burke Electric Co., Erie, Pa.
Byron Jackson Co., Los Angeles, Calif. (Submersible)
Century Electric Co., St. Louis, Mo.
Continental Electric Co., Inc., Newark, N. J.
Crocker-Wheeler Elec. Mfg. Co., Div., Joshua Hendy Iron Works, Ampere, N. J.
● Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Somerville, N. J.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Electro Dynamic, Div. of the Electric Boat Co., Bayonne, N. J.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hertner Electric Co., Inc., Cleveland, O.
Holtzer-Cabot, Div. First Industrial Corp., Boston, Mass.
Howell Electric Motors Co., Howell, Mich.
Ideal Electric & Mfg. Co., Mansfield, O.
Imperial Electric Co., Akron, O.
Jackson Co., Byron, Los Angeles, Calif. (Submersible)
● Janette Mfg. Co., Chicago, Ill.
Leland Electric Co., Dayton, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Master Electric Co., Dayton, O.
● Moore Co., The, Kansas City, Mo., (slow speed fan motors)
Peerless Electric Co., Warren, O.
Reliance Electric & Engineering Co., Cleveland, O.
Robbins & Myers, Inc., Springfield, O.
Sawyer Electrical Mfg. Co., Los Angeles, Calif.
Star Electric Motor Co., Bloomfield, N. J.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.

● Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whirlaway Motors, Inc., Tipp City, O.

MUSHROOM VENTILATORS

See Ventilators, Mushroom

NEEDLE BEARINGS

See Bearings, Needle

NEEDLE VALVES

See Valves, Needle

NEUTRALIZERS, ACID

See Dehydrant and Acid Neutralizer

NEUTRALIZERS, ODOR

See Adsorbers, Odor

NICKEL AND NICKEL ALLOY PIPE AND FITTINGS

See Tubing, Nickel and Alloy; Fittings, Pipe, Nickel and Nickel Alloy; Pipe, Nickel and Nickel Alloy

NICKEL AND NICKEL ALLOY SHEETS

See Sheets, Nickel and Nickel Alloy

NIPPLES, PIPE, BRASS AND COPPER

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Nipple Mfg. Co., Cicero, Ill.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
● Crane Co., Chicago, Ill.
Downs-Smith Brass & Copper Co., New York, N. Y.
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., The, Cleveland, O.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Petroleum Equipment Mfg. Co., New Haven, Conn.
Sales & Co., Murray W., Detroit, Mich.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Weatherhead Co., Cleveland, O.

NIPPLES, PIPE, FLEXIBLE

Davis Engineering Corp., Elizabeth, N. J.

NIPPLES, PIPE, IRON AND STEEL

Alabama Pipe Co., Anniston, Ala. (Cast iron)
Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (Stainless)
● Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa. (Swage)
Ellsworth Pipe & Supply Co., Milwaukee, Wis.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Illinois Malleable Iron Co., Chicago, Ill.
Larkin Packer Co., St. Louis, Mo.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Sales & Co., Murray W., Detroit, Mich.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
● Youngstown Sheet & Tube Co., Youngstown, O.

NIPPLES, PIPE, NICKEL AND NICKEL ALLOY

Cooper Alloy Foundry Co., Hillside, N. J.
International Nickel Co., Inc., The, New York, N. Y.

NIPPLES, RADIATOR, SLIP AND SCREW

Plumb Mfg. Co., Utica, N. Y.

NOISE ELIMINATORS

See Bases and Pads, Vibration Isolating; Hose, Metal and Fittings; Insulation, Sound Deadening

NOZZLES, ATOMIZING

Bahnson Co., Winston-Salem, N. C.
Benjamin Air Rifle Co., St. Louis, Mo.
Binks Mfg. Co., Chicago, Ill.
Delavan Engineering Co., Des Moines, Ia.

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● Maid-O'-Mist, Inc., Chicago, Ill.
● Marley Co., Inc., The, Kansas City, Mo.
● Martocello & Co., Jos. A., Philadelphia, Pa.
Ross Sprinkler Co., Pasadena, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Chicago, Ill.
Steamaire Co., Cincinnati, O.
Supreme Electric Products Corp., Rochester, N. Y.

NOZZLES, FLOODING

● Marley Co., Inc., The, Kansas City, Mo.

NOZZLES, SPARGER, FOR TANK HEATING

Schutte & Koerting Co., Philadelphia, Pa.

NOZZLES, SPRAY

American Cooling Tower Co., Kansas City, Mo.
American Molded Products Co., Chicago, Ill.
April Showers Co., Washington, D. C.
Bahnson Co., Winston-Salem, N. C.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Bayley Blower Co., Milwaukee, Wis.
Benjamin Air Rifle Co., St. Louis, Mo.
Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Baltimore, Md.
Blower Application Co., Milwakee, Wis.
● Buffalo Forge Co., Buffalo, N. Y.
Chain Belt Co., Milwaukee, Wis.
● Clarage Fan Co., Kalamazoo, Mich.
Delavan Engineering Co., Des Moines, Ia.
Dustlix Corp., Milwaukee, Wis.
Eclipse Air Brush Co., Inc., Newark, N. J.
Electric Sprayit Co., The, Sheboygan, Wis.
Fluor Corp., Ltd., The, Los Angeles, Calif.
● Grinnell Co., Inc., Providence, R. I.
Hubbard Manufacturing Co., Minneapolis, Minn.
International Moistening Co., Providence, R. I.
Link-Belt Co., Chicago, Ill.
● Maid-O'-Mist, Inc., Chicago, Ill.
● Marley Co., Inc., The, Kansas City, Kans.
● Martocello & Co., Jos. A., Philadelphia, Pa.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
National Engineering & Mfg. Co., Kansas City, Mo.
Parks-Cramer Co., Fitchburg, Mass.
Phillips Cooling Tower Co., Inc., New York, N. Y.
Plummer Spray Equipment Co., Napoleon, O.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Rega Mfg. Co., Rochester, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Ross Sprinkler Co., Pasadena, Calif.
Schutte & Koerting Co., Philadelphia, Pa.
Skinner Irrigation Co., Troy, O.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Chicago, Ill.
Supreme Electric Products Corp., Rochester, N. Y.
Thermal Industries, Indio, Calif.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Corp., St. Louis, Mo.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Yarnall-Waring Co., Philadelphia, Pa.

NUTS, LOCK

Buffalo Bolt Co., North Tonawanda, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
● Crane Co., Chicago, Ill.
Dzus Fastener Co., Inc., Babylon, N. Y.
Elastic Stop Nut Corp. of America, Union, N. J.
● Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
● Grinnell Co., Inc., Providence, R. I.
Industrial Screw Co., Chicago, Ill.
Kwikon Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Locknut Corp. of America, Chicago, Ill.
MacLean-Fogg Lock Nut Co., Chicago, Ill.
Malleable Iron Fittings Co., Branford, Conn.
Palnut Co., Irvington, N. J.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
SKF Industries, Inc., Philadelphia, Pa.
Shakeproof, Inc., Chicago, Ill. (Lock washers)
Standard Pressed Steel Co., Jenkintown, Pa.
Tinnerman Products, Inc., Cleveland, O.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

OBSERVATION BOILER PORTS

See Ports, Observation, Boiler

ODOR ADSORBERS

See Filters, Air; Adsorbers, Odor

ODOR NEUTRALIZERS

See Adsorbers, Odor; Compounds, Air Freshening

OIL BURNERS

See Burners, Oil

OIL COOLERS

See Coolers, Oil

OIL FIRED UNIT HEATERS

See Heaters, Unit, Oil Fired

OIL SEPARATORS

See Separators, Steam and Oil

OPEN END WRENCHES

See Wrenches, Open End

OPERATORS, DAMPER, DUCT

Arens Controls, Inc., Chicago, Ill.
● Autempco Corp., New York, N. Y.
● Automatic Products Co., Milwaukee, Wis.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
● Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● General Controls Co., Glendale, Calif.
Hotstream Heater Co., Cleveland, O.
● Johnson Service Co., Milwaukee, Wis.
● Kieley & Mueller, Inc., North Bergen, N. J.
Mason-Neilan Regulator Co., Boston, Mass.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Chicago, Ill.
Sampsel Time Control, Inc., Spring Valley, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Young Regulator Co., Cleveland, O.

OPERATORS, VALVE

● Autempco Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
● Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Foxboro Co., Foxboro, Mass.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● General Controls Co., Glendale, Calif.
Grove Regulator Co., Oakland, Calif.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
● Johnson Service Co., Milwaukee, Wis.
● Kieley & Mueller, Inc., North Bergen, N. J.
Mason-Neilan Regulator Co., Boston, Mass.
● McDonnell & Miller, Inc., Chicago, Ill.
McIntyre Div., Eastern Industries, Newton, Mass.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Powers Regulator Co., Chicago, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.

ORIFICE FLANGES

See Flanges, Orifice

ORIFICE UNIONS

See Unions, Orifice

ORIFICES, RADIATOR

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
Cashin Co., W. D., Boston, Mass.
● Dunham Co., C. A., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
New York Air Valve Corp., New York, N. Y.

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● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
● Sterling, Inc., Milwaukee, Wis.
Tallmadge & Co., Webster, East Orange, N. J.
● Thrush & Co., H. A., Peru, Ind.
Webster Tallmadge & Co., East Orange, N. J.

OXY-ACETYLENE WELDING

See Welding and Cutting Apparatus, Oxy-Acetylene

OXYGEN RECORDERS

See Recorders, Oxygen

OZONE APPARATUS

A & J Co., Chicago, Ill.
Coroaire Heater Corp., The, Cleveland, O.
Electroaire Corp., Chicago, Ill.
General Ozone Corp., Chicago, Ill.
Montgomery Bros., San Francisco, Calif.
Norwood Filtration Co., The, Florence, Mass.
Ozone Air Co., Grand Rapids, Mich.
Ozo-Ray Products Mfg. Co., Div. of Lidgerwood Mfg. Co., New York, N. Y.
Sealkote Corp., Chicago, Ill.
United States Ozone Co. of America, Scottdale, Pa.
Welsbach Corp., The, Ozone Processes Div., Philadelphia, Pa.

PACKAGED HEAT PUMP UNITS

See Units, Air Conditioning, Reverse Refrigeration Cycle

PACKAGED STEAM GENERATORS

See Boilers, Steam Generating Units, Heating and Process

PACKING, ASBESTOS

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Austin-Mason Co., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Chicago Specialty Mfg. Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Durabla Mfg. Co., New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felt Products Mfg. Co., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.
Goodyear Tire & Rubber Co., Akron, O.
● Grant Wilson, Inc., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
● Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Klingerit, Inc., New York, N. Y. (Sheet and rod)
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Sall Mountain Co., Chicago, Ill.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.
● Wilson, Inc., Grant, Chicago, Ill.

PACKING, FIBER

Anchor Packing Co., Philadelphia, Pa.
Austin-Mason Co., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Darcoid Co., Inc., New York, N. Y.
Durabla Mfg. Co., New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Endura Mfg. Corp., Quakertown, Pa.
Garlock Packing Co., Palmyra, N. Y.
Greene, Tweed & Co., North Wales, Pa.
● Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Metallo Gasket Co., New Brunswick, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.

PACKING, LEATHER

Alexander Bros., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Chicago Belting Co., Chicago, Ill.
Davies & Co., Wayne, Westboro, Mass.
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Graton & Knight, Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
● Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.
Wayne Davies & Co., Worcester, Mass.
Williams & Son, I. B., Dover, N. H.

PACKING, METALLIC

Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Austin-Mason Co., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill.
France Packing Co., Tacony, Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Hound Packing Co., Chicago, Ill.
● Johns-Manville, New York, N. Y.
Klingerit, Inc., New York, N. Y. (Sheet & rod)
Linear Incorporated, Philadelphia, Pa.
McQuay-Norris Mfg. Co., St. Louis, Mo.
National Engineering Products, Inc., Washington, D. C.
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.

PACKING, RUBBER AND SYNTHETIC

Anchor Packing Co., Philadelphia, Pa.
Armstrong Cork Co., Lancaster, Pa.
Austin-Mason Co., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Boston Woven Hose & Rubber Co., Boston, Mass.
Chicago Belting Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Dow Corning Corp., Midland, Mich.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felt Products Mfg. Co., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Graton & Knight Co., Worcester, Mass.
Greene, Tweed & Co., North Wales, Pa.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Houghton & Co., E. F., Philadelphia, Pa.
● Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Linear Incorporated, Philadelphia, Pa.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Plant Rubber & Asbestos Works, San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Resistoflex Corp., Belleville, N. J.
Thermoid Co., Trenton, N. J.
Union Asbestos & Rubber Co., Cicero, Ill.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.

PANELS, PERFORATED, FOR AIR DIFFUSION

● Pyle-National Co., The, Chicago, Ill.

PARTS FOR HEATING AND AIR CONDITIONING EQUIPMENT

Ackermann Mfg. Co., Wheeling, W. Va.
American Welding & Mfg. Co., Warren, O.
Camloc Fastener Corp., New York, N. Y. (Fasteners for access panels and sheet metal)
Carey Mfg. Co., Philip, Cincinnati, O. (Insulating panel for housing and duct construction)
Commercial Shearing & Stamping Co., Youngstown, O. (Tank heads and bottoms, water heater legs, furnace stampings, etc.)
Detroit Stamping Co., Detroit, Mich.
Falstrom Co., Passaic, N. J. (Air conditioning cabinets, steel control panels)
Geuder, Paeschke & Frey Co., Milwaukee, Wis.
Lindsay Corp., The, Melrose Park, Ill. (Cabinet construction for air conditioning and warm air heating equipment)

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Mueller Brass Co., Port Huron, Mich. (Specially fabricated copper tubing, machine formed tubes)
Rigid-Tex Corp., Buffalo, N. Y.

PILLOW BLOCK BEARINGS

See Bearings, Pillow Block

PILOT LIGHTS

See Lights, Pilot and Signal

PIPE, ALUMINUM

● Aluminum Co. of America, Pittsburgh, Pa.
Colonial Alloy Co., Metals Div., Philadelphia, Pa.
● Revere Copper & Brass, Inc., New York, N. Y.

PIPE, ASBESTOS FIBER AND CEMENT

● Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
United States Stoneware Co., New York, N. Y.

PIPE BENDERS

See Benders, Pipe

PIPE, BRASS AND COPPER

● American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Hussey & Co., C. G., Pittsburgh, Pa.
● Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Phelps Dodge Copper Products Corp., British American Tube Div., New York, N. Y.
Reading Tube Corp., New York, N. Y.
● Revere Copper and Brass., Incorporated, New York, N. Y.
● Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.

PIPE, CAST IRON, PRESSURE, BELL AND SPIGOT

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Central Foundry Co., New York, N. Y.
Clow & Sons, James B., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
United States Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE, CAST IRON, PRESSURE, FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.
United States Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE, CAST IRON, THREADED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
McWane Cast Iron Pipe Co., Birmingham, Ala.
Somerville Iron Wks., Somerville, N. J.
United States Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE CLEANING COMPOUNDS

See Compounds, Cleaning, Pipe Coil and Condenser

PIPE COILS

See Coils, Pipe

PIPE COUPLINGS

See Couplings, Pipe

PIPE COVERING, ADHESIVES

See Adhesives, for Pipe Covering

PIPE CUTTERS

See Cutters

PIPE CUTTING MACHINES

See Machines, Pipe Cutting and Threading

PIPE EXTRACTORS

See Extractors, Pipe

PIPE, FIBER

Brown Co., New York, N. Y.
Fibre Conduit Co., Orangeburg, N. Y.

PIPE FITTINGS

See Fittings, Pipe

PIPE FLANGES

See Flanges, Pipe

PIPE, GLASS

Corning Glass Wks., Corning, N. Y.
Fischer & Porter Co., Hatboro, Pa.

PIPE HANGERS

See Hangers and Supports, Pipe

PIPE, HARD RUBBER

American Hard Rubber Co., New York, N. Y.
Goodrich Co., B. F., Akron, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Raybestos-Manhattan, Inc., Passaic, N. J.
Stokes Molded Products, Trenton, N. J.
United States Rubber Co., New York, N. Y.

PIPE INSULATION

See Insulation, Pipe

PIPE INSULATION ADHESIVES

See Adhesives, for Pipe Covering

PIPE, JACKETED

Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Kaiser Co., E. B., Chicago, Ill.
Nooter Boiler Works Co, John, St. Louis, Mo.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Shaw-Kendall Engineering Co., Toledo, O.

PIPE JOINT COMPOUNDS

See Cement and Compounds, Pipe Joint

PIPE, LINED

● American Brass Co., Waterbury, Conn. (Tin)
American Cast Iron Pipe Co., Birmingham, Ala. (Cement)
American Hard Rubber Co., New York, N. Y. (Rubber)
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Cement Lined Pipe Co., Lynn, Mass.
Clow & Sons, James B., Chicago, Ill.
Cohoes Rolling Mill Co., Cohoes, N. Y. (Cement)
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y. (Lead)
Gates Engineering Co., Wilmington, Del.
General Plate Div., Metals & Controls Corp., Attleboro, Mass. (Silver lined)
Goodrich Co., B. F., Akron, O. (Rubber-lined)
Jones & Laughlin Steel Corp., Pittsburgh, Pa. (Cement)
Kaiser Co., E. B., Chicago, Ill.
Knight, Maurice A., Akron, O.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Michigan Pipe Co., Bay City, Mich. (Wood)
National Lead Co., New York, N. Y. (Lead)
Nooter Boiler Works Co., John, St. Louis, Mo.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
Smith Corp., A. O., Milwaukee, Wis.
United States Rubber Co., New York, N. Y. (Rubber)
United States Stoneware Co., New York, N. Y.
Vesco Corp., New York, N. Y. (Enamel)
Warren Foundry & Pipe Corp., New York, N. Y. (Cement)
● Youngstown Sheet & Tube Co., Youngstown, O.

PIPE LINE STRAINERS

See Strainers, Pipe Line

PIPE, MAGNESIUM

● Revere Copper and Brass, Inc., New York, N. Y.

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PIPE, NICKEL AND NICKEL ALLOY

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
● Globe Steel Tubes Co., Milwaukee, Wis.
International Nickel Co., New York, N. Y.
● Revere Copper and Brass, Incorporated, New York, N. Y.

PIPE NIPPLES

See Nipples, Pipe

PIPE, PLASTIC

Acadia Synthetic Products, Div., Western Felt Works, Chicago, Ill.
Amerform Corp., Philadelphia, Pa.
American Hard Rubber Co., New York, N. Y.
Commercial Plastics Co., Chicago, Ill.
Continental Diamond Fibre Co., Newark, Del.
Extruded Plastics, Inc., Norwalk, Conn.
Mills Corp., Elmer E., Chicago, Ill.
North Penn Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.

PIPE, PRE-INSULATED

Baldwin-Hill Co., Trenton, N. J.
● Durant Insulated Pipe Co., Palo Alto, Calif.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Kaiser Co., E. B., Chicago, Ill.
● Ric-wiL Co., Cleveland, O.

PIPE REAMERS

See Reamers, Pipe

PIPE REPAIR CLAMPS

See Clamps, Pipe Repair

PIPE, SPIRAL, RIVETED AND WELDED

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Columbian Steel Tank Co., Kansas City, Mo.
● Naylor Pipe Co., Chicago, Ill.
● Revere Copper and Brass, Incorporated, New York, N. Y.
● Taylor Forge & Pipe Wks., Chicago, Ill.

PIPE, STEEL, ALLOY

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.

PIPE, STEEL, BUTT AND LAP WELDED

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
● Bethlehem Steel Co., Bethlehem, Pa.
Byers Co., A. M., Pittsburgh, Pa.
Chicago Metal Mfg. Co., Chicago, Ill.
Fretz-Moon Tube Co., Butler, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Tube Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Semet-Solvay Engineering Corp., New York, N. Y. (Specially fabricated)
South Chester Tube Co., Chester, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Tippett & Wood, Phillipsburgh, N. J. (12 in. and larger)
● Wheatland Tube Co., Philadelphia, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
● Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, SEAMLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
● Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., United States Steel Corp., Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Reading Tube Corp., New York, N. Y.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Canton, O.
● Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American Locomotive Co., Alco Products Div., New York, N. Y.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
● Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel and Tubes Div., Cleveland, O.
Timken Roller Bearing Co., Canton, O.
Trent Tube Mfg. Co., East Troy, Wis.

PIPE, STONEWARE

General Ceramics Co., Keasbey, N. J.
Knight, Maurice A., Akron, O. (Stoneware)
United States Stoneware Co., New York, N. Y. (Stoneware)

PIPE SUPPORTS

See Hangers and Supports, Pipe

PIPE TONGS

See Tongs, Pipe

PIPE, TUBING, FITTINGS AND VALVES, CARBON AND GRAPHITE

National Carbon Co., New York, N. Y.

PIPE AND TUBING, LEAD AND LEAD ALLOY

Alpha Metals, Inc., Brooklyn, N. Y.
Eagle-Picher Co., Cincinnati, O.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Works, Inc., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
United States Stoneware Co., New York, N. Y.

PIPE VISES

See Vises, Pipe

PIPE, WOOD

● American District Steam Co., North Tonawanda, N. Y.
Caldwell Co., W. E., Louisville, Ky.
Michigan Pipe Co., Bay City, Mich.
Wyckoff & Son Co., A., Elmira, N. Y.

PIPE WRENCHES

See Wrenches, Pipe

PIPE, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

PIPING IDENTIFICATION MARKERS

See Identification Markers for Piping Services

PISTON RINGS

See Rings, Piston

PITOT TUBES

See Tubes, Pitot

PITTSBURGH LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

PLASTIC PIPE AND PIPE FITTINGS

See Pipe, Plastic; Fittings, Pipe, Plastic

PLASTIC TUBING

See Tubing, Plastic

PLATES, FLOOR AND CEILING

Beaton & Cadwell Mfg. Co., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Jarecki Mfg. Co., Erie, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keeney Mfg. Co., Newington, Conn.
Little Mfg. Co., M. S., Hartford, Conn.
Russell Mfg. Co., John M., Naugatuck, Conn.
● Walworth Co., New York, N. Y.

PLUG COCKS

See Valves, Plug

PLUG VALVES

See Valves, Plug

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PLUGS, FUSIBLE, BOILER

Chicago Specialty Mfg. Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Swift Lubricator Co., Elmira, N. Y.
● Walworth Co., New York, N. Y.

PLUGS, REPAIR, FOR TANKS

Chicago Specialty Mfg. Co., Chicago, Ill.
Rolyan Metal Products, Chicago, Ill.

POROUS METAL

See Metal, Porous

PORTS, OBSERVATION, BOILER

Chicago Fire Brick Co., Chicago, Ill.
Detroit Stoker Co., Detroit, Mich.
Green Fire Brick Co., Mexico, Mo.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Ramite Co., The, Chicago, Ill.
Sims Co., Erie, Pa.
Springfield Boiler Co., Springfield, Ill.

POSITIONERS, WELDING

See Welding and Cutting Apparatus, Oxy-Acetylene

POWER SHEARS

See Shears, Power

PREHEATERS, FUEL OIL

● American District Steam Co., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper Co., Clark, Palmyra, N. J.
Crotty Mfg. Co., Flushing, L. I., N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Engineer Co., New York, N. Y.
Falcon Equipment Co., New Brighton, Pa.
● General Fittings Co., Providence, R. I.
Griscom-Russell Co., New York, N. Y.
Heat Transfer Products, Inc., Carbondale, Pa.
Hynes Electric Heating Co., Camden, N. J.
Industrial Engineering & Equipment Co., St. Louis, Mo. (Electric)
● Johnson Corp., The, Three Rivers, Mich.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
Oil Heat Master National Sales, New York, N. Y.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Peabody Engineering Corp., New York, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
● Rempe Co., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Semet-Solvay Engineering Corp., New York, N. Y.
Sims Co., Erie, Pa.
Standard Heater & Oil Equipment Co., Jersey City, N. J.
Staples & Pfeiffer, San Francisco, Calif.
Struthers Wells Corp., Titusville, Pa.
● Taco Heaters, Inc., New York, N. Y.
● Thrush & Co., H. A., Peru, Ind.
Todd Shipyards Corp., Combustion Equipment Div., New York, N. Y.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Warren Electric Appliance Co., Warren, Pa.
Whitlock Mfg. Co., Hartford, Conn.
● Wiegand Co., Edwin L., Pittsburgh, Pa. (Electric)

PREHEATERS AND STRESS RELEIVERS, ELECTRIC, FOR PIPE WELDS

Electric Arc, Inc., Newark, N. J.
Falcon Equipment Co., New Brighton, Pa.
Hynes Electric Heating Co., Camden, N. J.
Trent Inc., Philadelphia, Pa.

PRE-INSULATED PIPE

See Pipe, Pre-Insulated

PRESSURE BLOWERS

See Blowers, High Pressure

PRESSURE CONTROLLERS

See Regulators, Pressure

PRESSURE GAGES

See Gages, Indicating, Pressure

PRESSURE INDICATOR-CONTROLLERS

See Indicator-Controllers, Pressure

PRESSURE RECORDER-CONTROLLERS

See Recorder-Controllers, Pressure

PRESSURE RECORDERS

See Recorders, Pressure and Vacuum

PRESSURE REDUCING VALVES

See Valves, Pressure Reducing and Regulating

PRESSURE REGULATING VALVES

See Valves, Pressure Reducing and Regulating

PRESSURE REGULATORS

See Regulators, Pressure

PRESSURE SWITCHES

See Switches, Pressure and Vacuum

PROCESS HEATING SYSTEMS

See Systems, Process Heating, High Temperature

PROCESS STEAM SUPERHEATERS

See Superheaters, Process Steam

PROCESS AND STORAGE TANKS

See Tanks, Process and Storage

PROPELLER FANS

See Fans, Propeller

PROPELLER PUMPS

See Pumps, Propeller

PROPORTIONING PUMPS

See Pumps, Proportioning

PROTECTIVE COATINGS

See Coatings, Protective, for Metal

PROTECTORS, PIPE COVERING

● American District Steam Co., North Tonawanda, N. Y.
Carpenter & Paterson, Inc., East Boston, Mass.
Cinder Products Corp., Providence, R. I.
● Grinnell Co., Inc., Providence, R. I.
● Ric-wiL Co., Cleveland, O.

PSYCHROMETERS, SLING AND HAND ASPIRATED

American Moistening Co., Providence, R. I.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
General Scientific Equipment Co., Philadelphia, Pa.
● Grinnell Co., Inc., Providence, R. I.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon, Chicago, Ill
● Johnson Service Co., Milwaukee, Wis.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Co., Cincinnati (Norwood), O.
Parks-Cramer Co., Fitchburg, Mass.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.
● Weston Electrical Instrument Corp., Newark, N. J.

PSYCHROSTATS

See Humidistats

PULLEYS AND SHEAVES, FOR BELT DRIVES

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Die Casting Mfg. Co., Chicago, Ill. (v-type)
Congress Drives Div., Tann Corp., Detroit, Mich. (V belt—fractional and multiple horsepower)
Dayton Rubber Co., Dayton, O.
Delavan Engineering Co., Des Moines, Ia. (Cast iron)
Dick Co., Inc., R. & J., Passaic, N. J. (Steel split)
Doall Co., The, Des Plaines, Ill.

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Dodge Mfg. Corp., Mishawaka, Ind.
Gates Rubber Co., The, Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga. (Cast iron)
Horton Mfg. Co., Minneapolis, Minn. (Variable speed)
Lau Blower Co., Dayton, O.
Lewellen Mfg. Co., Columbus, Ind.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Maurey Mfg. Corp., Chicago, Ill. (v-belt steel and cast iron)
Pyott Foundry & Machine Co., Chicago, Ill.
Rockwood Mfg. Co., Inc., Indianapolis, Ind.
● Schnacke, Inc., Evansville, Ind. (v-type)
Scientiae Tool Co., Dayton, O. (variable pitch)
Swift Mfg. Co., Inc., Detroit, Mich. (Cast iron)
Thermoid Co., Trenton, N. J.
● Utility Appliance Corp., Los Angeles, Calif.
V-Belt Clutch Co., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Webster Electric Co., Racine, Wis.
Wood's Sons Co., T. B., Chambersburg, Pa.
● Worthington Pump & Machinery Corp., Harrison, N. J. (v-type)

PULVERIZED COAL BURNERS

See Burners, Pulverized Coal

PUMP BASES

See Bases and Pads, Vibration Isolating

PUMP UNITS, FUEL OIL

See Units, Fuel Oil, Heating, Pumping and Straining

PUMP VALVES

See Valves, Pump

PUMPS, BOILER FEED

Acker Organizations, Inc., W. M., Cleveland, O.
Aldrich Pump Co., Allentown, Pa.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Austin-Mason Co., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Columbus Steam Pump Wks., Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cyclotherm Corp., New York, N. Y.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
Dutton Co., C. H., Kalamazoo, Mich
● Eagan Co., Walter H., Philadelphia, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
● Economy Pumps, Inc., Hamilton, O.
El Sereno Machine Works, Azusa, Calif.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Works, Inc., Brooklyn, N. Y.
Foster Wheeler Corp., New York, N. Y.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
● Johnson Corp., The, Three Rivers, Mich.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
● McDonnell & Miller, Inc., Chicago, Ill.
Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Morris Machine Works, Baldwinsville, N. Y.
● Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Oberdorfer Industries, Inc., Syracuse, N. Y.
● Pacific Pumping Co., San Francisco, Calif.
Pacific Pumps, Inc., Huntington Park, Calif.
● Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Robbins & Myers, Inc., Springfield, O.
● Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Sellers Engineering Co., Chicago, Ill.
● Skidmore Corp., St. Joseph, Mich.
● Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swaby Mfg. Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
● Weil Pump Co., Chicago, Ill.
● Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Co., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, CENTRIFUGAL

Aldrich Pump Co., Allentown, Pa.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
American Metal Products Co., Fort Worth, Tex.
American Well Wks., Aurora, Ill.
Ames Hydrovac, Inc., Brooklyn, N. Y.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Barrett, Haentjens & Co., Hazleton, Pa.
Beach-Russ Co., New York, N. Y.
Beckett & Co., Inc., Thomas, Dallas, Tex.
● Bell & Gossett Co., Morton Grove, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blaisdell Compressor Co., New York, N. Y.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Bump Pump Co., LaCrosse, Wis.
Byron Jackson Co., Los Angeles, Calif.
Carver Pump Co., Muscatine, Ia.
Chain Belt Co., Milwaukee, Wis.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
● Dunham Co., C. A. Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
● Eagan Co., Walter H., Philadelphia, Pa.
Eastern Engineering Co., New Haven, Conn.
● Economy Pumps, Inc., Hamilton, O.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Works, Inc., Brooklyn, N. Y.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Gardner-Denver Co., Quincy, Ill.
General Ceramics Co., Keasbey, N. J. (Chemical stoneware)
Gorman-Rupp Co., Mansfield, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
La Bour Co., Inc., The, Elkhart, Ind.
Lamson Corp., Syracuse, N. Y.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Lewis & Co., Inc., Chas. S., St. Louis, Mo.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Marco Co., Inc., Wilmington, Del.
Morey, Dan, Los Angeles, Calif. (recirculating for evaporative coolers)
Morris Machine Works, Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
National Carbon Co., New York, N. Y.
Oberdorfer Industries, Inc., Syracuse, N. Y.
● Pacific Pumping Co., San Francisco, Calif.
Pacific Pumps, Inc., Huntington Park, Calif.
Palmer Electric Co., Detroit, Mich.
● Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Ruthman Machinery Co., Cincinnati, O.
Schneible Co., Claude B., Detroit, Mich.
Schwitzer-Cummins Co., Indianapolis, Ind.
● Skidmore Corp., St. Joseph, Mich.
Smith Corp., A. O., Milwaukee, Wis.
Standard Electric Mfg. Co., West Berlin, N. J.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
● Trane Co., The, LaCrosse, Wis.
Union Steam Pump Co., Battle Creek, Mich.
● Utility Appliance Corp., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Warren Steam Pump Co., Inc., Warren, Mass.
Webb Co., The, Webb City, Mo.
● Weil Pump Co., Chicago, Ill.
● Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Co., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, CONDENSATION RETURN

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Marsh Pumps, Inc., Battle Creek, Mich.
Ames Hydrovac, Inc., Brooklyn, N. Y.
Aurora Pump Co., Aurora, Ill.

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Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Cochrane Corp., Philadelphia, Pa.
Columbus Steam Pump Wks. Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
● Dunham Co., C. A., Chicago, Ill.
Dutton Co., C. H., Kalamazoo, Mich.
● Eagan Co., Walter H., Philadelphia, Pa.
Eastern Engineering Co., New Haven, Conn.
Eclipse Fuel-Engineering Co., Rockford, Ill.
● Economy Pumps, Inc., Hamilton, O.
Fairbanks, Morse & Co., Chicago, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Heating Assurance, Inc., Spokane, Wash.
● Hoffman Specialty Co., Indianapolis, Ind.
● Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
● Johnson Corp., The, Three Rivers, Mich.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Myers & Bro. Co., The F. E., Ashland, O.
● Nash Engineering Co., South Norwalk, Conn.
Oberdorfer Industries, Inc., Syracuse, N. Y.
O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
● Pacific Pumping Co., San Francisco, Calif.
● Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
● Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Sellers Engineering Co., Chicago, Ill.
● Skidmore Corp., St. Joseph, Mo.
● Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swaby Mfg. Co., Chicago, Ill.
● Trane Co., The, LaCrosse, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
● Weil Pump Co., Chicago, Ill.
● Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Co., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, DEEP WELL, TURBINE

American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Wks., Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Byron Jackson Co., Los Angeles, Calif.
Climax Engineering Co., Clinton, Ia.
Cook, Inc., A. D. Lawrenceburg, Ind.
Davidson Co., M. T., Brooklyn, N. Y.
Decatur Pump Co., Decatur, Ill. (shallow well)
Deming Co., Salem, O.
● Eagan Co., Walter H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
● Layne & Bowler, Inc., Memphis, Tenn.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
● Pacific Pumping Co., San Francisco, Calif.
● Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Red Jacket Mfg. Co., Davenport, Ia.
Smith Corp., A. O., Milwaukee, Wis.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, FIRE

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
● Economy Pumps, Inc., Hamilton, O.
Fairbanks, Morse & Co., Chicago, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Gorman-Rupp Co., Mansfield, O.
Guild & Garrison, Inc., Brooklyn, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
● Layne & Bowler, Inc., Memphis, Tenn.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Morris Machine Wks., Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
Oberdorfer Industries, Inc., Syracuse, N. Y.
● Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, HIGH PRESSURE, HYDRAULIC

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Dudgeon, Inc., Richard, New York, N. Y.
National Steam Pump Co., Upper Sandusky, O.
Roper Corp., Geo. D., Rockford, Ill.
Viking Pump Co., Cedar Falls, Ia.

PUMPS, LIQUID REFRIGERANT CIRCULATING

American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brunner Mfg. Co., Utica, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
● Eagan Co., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Fairbanks, Morse & Co., Chicago, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Lewis & Co., Chas. S., St. Louis, Mo.
Pacific Pumps, Inc., Huntington Park, Calif.
● Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Roper Corp., Geo. D., Rockford, Ill.
Viking Pump Co., Cedar Falls, Ia.
Vilter Mfg. Co., Milwaukee, Wis.
Warren Steam Pump Co., Inc., Warren, Mass.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, PROPELLER

American Well Works, Aurora, Ill.
Byron Jackson Co., Los Angeles, Calif.
● Economy Pumps, Inc., Hamilton, O.
● Ingersoll-Rand Co., New York, N. Y.
Jackson Co., Byron, Los Angeles, Calif.
Pacific Pumps, Inc., Huntington Park, Calif.
● Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Ruthman Machinery Co., Cincinnati, O.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, PROPORTIONING

Blackburn-Smith Mfg. Co., Hoboken, N. J.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Cochrane Corp., Philadelphia, Pa.
Dearborn Chemical Co., Chicago, Ill.
Marco Co., Inc., Wilmington, Del.
Nelson Chemical Pumps, Casper, Wyo.
% Proportioneers, Inc. %, Providence, R. I.
Roy Co., Milton, Philadelphia, Pa.
Wallace & Tiernan Co., Inc., Newark, N. J.

PUMPS, RECIPROCATING

Aldrich Pump Co., Allentown, Pa.
Alten's Foundry & Machine Works, Lancaster, O.
American Hard Rubber Co., New York, N. Y. (Rubber and Rubber lined)
American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., New York, N. Y.
Brunner Mfg. Co., Utica, N. Y.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Columbus Steam Pump Wks., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cook, Inc., A. D., Lawrenceburg, Ind.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Deming Co., Salem, O.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Duro Co., Dayton, O.
● Eagan Co., Walter H., Philadelphia, Pa.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pumps Wks., Inc., Brooklyn, N. Y.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Homestead Valve Mfg. Co., Coraopolis, Pa.
● Ingersoll-Rand Co., New York, N. Y.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.

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Myers & Bro. Co., F. E., The, Ashland, O.
National Steam Pump Co., Upper Sandusky, O.
Red Jacket Mfg. Co., Davenport, Ia.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Roy Co., Milton, Philadelphia, Pa.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
● Watson-Stillman Co., Roselle, N. J.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, ROTARY

American Engineering Co., Philadelphia, Pa.
American Hard Rubber Co., New York, N. Y. (Rubber and rubber lined)
Beach-Russ Co., New York, N. Y.
Blackmer Pump Co., Grand Rapids, Mich.
Bowser, Inc., Fort Wayne, Ind.
Bump Pump Co., La Crosse, Wis.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
● Eagan Co., Walter H., Philadelphia, Pa.
Eastern Engineering Co., New Haven, Conn.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Jabsco Pump Co., Burbank, Calif.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Lamson Corp., Syracuse, N. Y.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Marco Co., Inc., Wilmington, Del.
● Martocello & Co., Jos. A., Philadelphia, Pa.
May Oil Burner Corp., Baltimore, Md.
McIntyre Div., Eastern Industries, Newton, Mass.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
● Nash Engineering Co., South Norwalk, Conn.
Oberdorfer Industries, Inc., Syracuse, N. Y.
● Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Polo Pump Co., Polo, Ill.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
St. Louis Tool Co., St. Louis, Mo.
Schutte & Koerting Co., Philadelphia, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Sundstrand Machine Tool Co., Hydraulic Div., Rockford, Ill.
Taber Pump Co., Buffalo, N. Y.
Trimount Rotary Power Co., East Dedham, Mass.
Tuthill Pump Co., Chicago, Ill.
Viking Pump Co., Cedar Falls, Ia.
Webster Electric Co., Racine, Wis.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yale & Towne Mfg. Co., Stamford, Conn.

PUMPS, SEWAGE AND SLUDGE

American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Works, Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
● Eagan Co., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Gorman-Rupp Co., Mansfield, O.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Jackson Co., Byron, Los Angeles, Calif.
Jacuzzi Bros. Inc., Richmond, Calif.
Kingsford Foundry & Machine Works, Oswego, N. Y.
● Nash Engineering Co., South Norwalk, Conn.
● Pacific Pumping Co., San Francisco, Calif.
● Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Swaby Mfg. Co., Chicago, Ill.
● Weil Pump Co., Chicago, Ill.
● Weinman Pump Mfg. Co., The, Columbus, O.
Whittington Pump & Engineering Co., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, STEAM

American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Columbus Steam Pump Wks. Co., Columbus, O.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
● Eagan Co., Walter H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
National Steam Pump Co., Upper Sandusky, O.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
● Watson-Stillman Co., Roselle, N. J.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, SUMP

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Austin-Mason Co., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pneumatic Tool Co., New York, N. Y.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Cook, Inc., A. D., Lawrenceburg, Ind.
Davidson Co., M. T., Brooklyn, N. Y.
Dean Hill Pump Co., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Engine & Pump Co., Shippensburg, Pa.
Duro Co., Dayton, O.
● Eagan Co., Walter H., Philadelphia, Pa.
Eastern Engineering Co., New Haven, Conn.
● Economy Pumps, Inc., Hamilton, O.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Gorman-Rupp Co., Mansfield, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Independent Pneumatic Tool Co., Chicago, Ill.
● Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Cailf.
Jackson Co., Byron, Los Angeles, Cailf.
Jacuzzi Bros., Inc., Richmond, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Morris Machine Wks., Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
Noera Mfg. Co., Div., Chase Brass & Copper Co., Waterbury, Conn.
● Pacific Pumping Co., San Francisco, Calif.
● Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Penberthy Injector Co., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Quimby Pump Div., H. K. Porter Co., Inc., Pittsburgh, Pa.
Red Jacket Mfg. Co., Davenport, Ia.
Schneible Co., Claude B., Detroit, Mich.
Schutte & Koerting Co., Philadelphia, Pa.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Wade Mfg. Co., Elgin, Ill.
Warren Steam Pump Co., Inc., Warren, Mass.
● Weil Pump Co., Chicago, Ill.
● Weinman Pump Mfg. Co., The, Columbus, O.
Westco Pumps, Fairbanks, Morse & Co., St. Louis, Mo.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, VACUUM

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Automatic Typewriter Co., Chicago, Ill.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., New York, N. Y.
Beach-Russ Co., New York, N. Y.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
● Dunham Co., C. A., Chicago, Ill.
● Eagan Co., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Electric Sprayit Co., The, Sheboygan, Wis.
Foster Pump Wks., Inc., Brooklyn, N. Y.

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Foster Wheeler Corp., New York, N. Y.
Fuller Co., Catasauqua, Pa.
Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Lamson Corp., Syracuse, N. Y.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
● Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
● Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Roots-Connersville Blower Corp., Connersville, Ind.
Ross Heater & Mfg. Co., Inc., Buffalo, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
● Skidmore Corp., St. Joseph, Mich.
● Sterling, Inc., Milwaukee, Wis.
Stokes Machine Co., F. J., Philadelphia, Pa.
Trimount Rotary Power Co., East Dedham, Mass.
Union Steam Pump Co., Battle Creek, Mich.
Viking Pump Co., Cedar Falls, Ia.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whittington Pump & Engineering Co., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUMPS, VACUUM HEATING

American-Marsh Pumps, Inc., Battle Creek, Mich.
Ames Hydrovac, Inc., Brooklyn, N. Y.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Domestic Engine & Pump Co., Shippensburg, Pa.
● Dunham Co., C. A., Chicago, Ill.
● Eagan Co., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Gylstrom Co., O., Milwaukee, Wis.
● Hoffman Specialty Co., Indianapolis, Ind.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
● Nash Engineering Co., South Norwalk, Conn.
Roots-Connersville, Blower Corp., Connersville, Ind.
● Skidmore Corp., St. Joseph, Mich.
● Sterling, Inc., Milwaukee, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Whittington Pump & Engineering Co., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, VISCOUS LIQUIDS AND HEAVY MATERIALS

Aldrich Pump Co., Allentown, Pa.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Austin-Mason Co., New York, N. Y.
Beach-Russ Co., New York, N. Y.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blackmer Pump Co., Grand Rapids, Mich.
● Buffalo Pumps, Inc., Buffalo, N. Y.
Bump Pump Co., La Crosse, Wis.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., Brooklyn, N. Y.
● Dean Brothers Pumps, Inc., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
● Eagan Co., Walter H., Philadelphia, Pa.
● Economy Pumps, Inc., Hamilton, O.
Engineer Co., New York, N. Y.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
● Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Cailf.
Jacuzzi Bros., Inc., Richmond, Calif.
Jackson Co., Byron, Los Angeles, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Marco Co., Inc., Wilmington, Del.
Morris Machine Wks., Baldwinsville, N. Y.
Quimby Pump Div., H.K. Porter Co., Inc., Pittsburgh, Pa.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Roy Co., Milton, Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Taber Pump Co., Buffalo, N. Y.
Tuthill Pump Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
Whittington Pump & Engineering Co., Indianapolis, Ind.
● Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUNCHES, SHEET METAL

Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Inc., Cambridge City, Ind.
Bliss Co., E. W., Detroit, Mich.
C-B Tool Co., Lancaster, Pa.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Cleveland Punch & Shear Wks. Co., Cleveland, O.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Henry & Wright Mfg. Co., Hartford, Conn.
International Nutyp Tool Co., Oswego, N. Y.
Kidder Mfg. Co., Inc., J. F. Burlington, Vt.
New Albany Machine Mfg. Co., New Albany, Ind.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Parker-Kalon Corp., New York, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Perkins Machine Co., Warren, Mass.
Reiner & Campbell Co., Inc., Elizabeth, N. J.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Wiedemann Machine Co., Philadelphia, Pa.
Zeh & Hahnemann Co., Newark, N. J.

PURGERS, REFRIGERANT GAS

● Armstrong Machine Works, Three Rivers, Mich.
● Frick Co., Waynesboro, Pa.
Mueller Brass Co., Port Huron, Mich.
Vilter Mfg. Co., Milwaukee, Wis.

PUSHERS, PIPE, HYDRAULIC

Blackhawk Mfg. Co., Milwaukee, Wis.
Dudgeon, Inc., Richard, New York, N. Y.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.

RADIATION, BASEBOARD, FERROUS

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Burnham Corp., Boiler Div., Irvington, N. Y.
● Crane Co., Chicago, Ill.
● Dunham Co., C. A., Chicago, Ill.
Minimite Co., Chicago, Ill.
Utica Radiator Corp., Utica, N. Y.

RADIATION, BASEBOARD, NON-FERROUS

Beacon-Morris Corp., Allston, Boston, Mass.
Minimite Co., Chicago, Ill.
● Webster & Co., Warren, Camden, N. J.

RADIANT HEAT THERMOSTATS

See Thermostats, Radiant Heat

RADIANT HEATING ELECTRICAL CONDUCTORS

See Conductors, Electrical, for Radiant Heating

RADIATION, CONVECTION TYPE, FERROUS

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Brown Fintube Co., The, Elyria, O.
Minimite Co., Chicago, Ill.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
Richmond Radiator Co., New York, N. Y.
● Rittling Corp., The, Buffalo, N. Y.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
● United States Radiator Corp., Detroit, Mich.
● Vulcan Radiator Co., Hartford, Conn.
Weil-McLain Co., Chicago, Ill.

RADIATION, CONVECTION TYPE, NON-FERROUS

● Airtherm Mfg. Co., St. Louis, Mo.
American Coils Co., Newark, N. J.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Beacon-Morris Corp., Boston, Mass.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., Hartford, Conn.
● Dunham Co., C. A., Chicago, Ill.
● Extended Surface, Div. of David E. Kennedy, Inc., Brooklyn, N. Y.
G. & O. Mfg. Co., New Haven, Conn.
Kehm Corp., The, Chicago, Ill.

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Minimite Co., Chicago, Ill.
● Modine Mfg. Co., Racine, Wis.
● Nesbitt Inc., John J., Philadelphia, Pa.
Refrigeration Economics Co., Inc., Canton, O.
● Rittling Corp., The, Buffalo, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Super Radiator Corp., Minneapolis, Minn.
● Trane Co., The, La Crosse, Wis.
● Tuttle & Bailey, Inc., New Britain, Conn.
Vapor Car Heating Co., Inc., Chicago, Ill.
● Vulcan Radiator Co., Hartford, Conn.
● Webster & Co., Warren, Camden, N. J.
● Young Radiator Co., Racine, Wis.

RADIATION, DIRECT

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Burnham Corp., Boiler Div., Irvington, N. Y.
Clifford Mfg. Co., Boston, Mass. (For aircraft)
Clow & Sons, James B., Chicago, Ill. (Gas fired)
Columbus Radiator Co., McKeesport, Pa.
● Crane Co., Chicago, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Fowler & Wolfe Radiator Co., Norristown, Pa.
Morton Associates, Inc., Henry J., Detroit, Mich. (Portable electric for supplementary heating)
● Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
● Rittling Corp., The, Buffalo, N. Y.
● United States Radiator Corp., Detroit, Mich.
Utica Radiator Corp., Utica, N. Y.
Weil-McLain Co., Michigan City, Ind.
Wilson Engineering Corp., Chicago, Ill.

RADIATION, FIN TUBE TYPE

American Coils Co., Newark, N. J.
Minimite Co., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Schutte & Koerting Co., Philadelphia, Pa.
● Smith Co., Inc., H. B., The, Westfield, Mass.
● Trane Co., The, La Crosse, Wis.

RADIATOR AND CONVECTOR HUMIDIFIERS

See Humidifiers for Radiators and Convectors

RADIATOR HANGERS

See Hangers or Brackets, Radiator

RADIATOR ORIFICE VALVES

See Valves, Radiator, Orifice

RADIATOR ORIFICES

See Orifices, Radiator

RADIATOR VALVES

See Valves, Radiator

RADIATOR VENT VALVE HUMIDIFIERS

See Humidifiers, Radiator Vent Valve

RADIATORS, GAS FIRED

Automatic Gas Equipment Co., Pittsburgh, Pa.
Brown Fintube Co., The, Elyria, O.
Clow & Sons, James B., Chicago, Ill.

RADIATORS, HUMIDIFYING

● Murray Mfg. Co., D. J., Wausau, Wis.

RATCHET WRENCHES

See Wrenches, Ratchet

REAMERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Crown Die & Tool Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Independent Pneumatic Tool Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Nye Tool & Machine Co., Chicago, Ill.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.

RECIPROCATING PUMPS

See Pumps, Reciprocating

RECORDER-CONTROLLERS, COMBINED TEMPERATURE AND HUMIDITY

American Instrument Co., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Ess Instrument Co., Bergenfield, N. J.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Towson, Baltimore, Md.
Gotham Instrument Co., Inc., New York, N. Y.
Leeds & Northrup Co., Philadelphia, Pa.
Manning Maxwell & Moore, Inc., Bridgeport, Conn.
Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDER-CONTROLLERS, HUMIDITY

American Instrument Co., Silver Spring, Md.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Towson, Baltimore, Md.
Gotham Instrument Co., Inc., New York, N. Y.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning Maxwell & Moore, Inc., Bridgeport, Conn.
Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDER-CONTROLLERS, PRESSURE

Bailey Meter Co., Cleveland, O.
Baldwin Locomotive Wks., Eddystone, Pa.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Inc., New York, N. Y.
● Hays Corp., Michigan City, Ind.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDER-CONTROLLERS, TEMPERATURE

American Instrument Co., Silver Spring, Md.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Towson, Baltimore, Md.
Gotham Instrument Co., Inc., New York, N. Y.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Chicago, Ill.
Pyrometer Instrument Co., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Div., C. J. Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
Wheelco Instruments Co., Chicago, Ill.

RECORDERS, CARBON DIOXIDE

Cole-Sewell Engineering Co., St. Paul, Minn.
Davis Emergency Equipment Co., Newark, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engelhard, Inc., Charles, Newark, N. J.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Uehling Instrument Co., Paterson, N. J.

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RECORDERS, COMBINED TEMPERATURE AND HUMIDITY

American Instrument Co., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Towson, Baltimore, Md.
Gotham Instrument Co., Inc., New York, N. Y.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Moeller Instrument Co., Richmond Hill, N. Y.
Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.

RECORDERS, DRAFT

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

RECORDERS, HUMIDITY

American Instrument Co., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Towson, Baltimore, Md.
H-B Instrument Co., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Moeller Instrument Co., Richmond Hill, N. Y.
Powers Regulator Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.

RECORDERS, LIQUID LEVEL

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Foxboro Co., Foxboro, Mass.
● Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Liquidometer Corp., Long Island City, N. Y.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Uehling Instrument Co., Paterson, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.

RECORDERS, OXYGEN

Bailey Meter Co., Cleveland, O.
Davis Emergency Equipment Co., Newark, N. J.
● Hays Corp., Michigan City, Ind.

RECORDERS, PRESSURE AND VACUUM

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Baldwin Locomotive Wks., Eddystone, Pa.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Defender Instrument and Regulator Co., St. Louis, Mo.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., Pasadena, Calif.
Gotham Instrument Co., Inc., New York, N. Y.
● Hays Corp., Michigan City, Ind.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
Moeller Instrument Co., Richmond Hill, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Stokes Machine Co., F. J., Philadelphia, Pa.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine & Metals, Inc. Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.

RECORDERS, SMOKE DENSITY

Bailey Meter Co., Cleveland, O.
Ess Specialty Corp., Bergenfield, N. J.
Furst Electronics, Chicago, Ill.
Power Engineering Co., Chicago, Ill.

RECORDERS, TEMPERATURE

American Instrument Co., Silver Spring, Md.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Engelhard, Inc., Charles, Newark, N. J.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Gotham Instrument Co., Philadelphia, Pa.
H-B Instrument Co., Philadelphia, Pa.
● Hays Corp., Michigan City, Ind.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
Moeller Instrument Co., Richmond Hill, N. Y.
Moore Products Co., Philadelphia, Pa.
Palmer Co., Cincinnati (Norwood), O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Chicago, Ill.
Precision Scientific Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrometer Instrument Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Div., C. J. Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Wheelco Instruments Co., Chicago, Ill.

RECORDING THERMOMETERS

See Recorders, Temperature

RECOVERY EQUIPMENT, AIR

See Adsorbers, Odor

REDUCERS, SPEED

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Bodine Electric Co., Chicago, Ill.
Boston Gear Wks., Inc., North Quincy, Mass.
De Laval Steam Turbine Co., Trenton, N. J.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Graham Transmissions, Inc., Milwaukee, Wis.
● Janette Mfg. Co., Chicago, Ill.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Link Belt Co., Philadelphia, Pa.
Medart Co., St. Louis, Mo.
Morse Chain Co., Ithaca, N. Y. (Chain speed)
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Poole Foundry & Machine Co., Baltimore, Md.
Shallcross Controls, Inc., Milwaukee, Wis.
Smith, Inc., Winfield H., Springville, N. Y.
Star Electric Motor Co., Bloomfield, N. J.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
● Stephens-Adamson Mfg. Co., Aurora, Ill.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.

REFRACTORIES AND REFRACTORY CEMENT

Amerform Corp., Philadelphia, Pa.
Armstrong Cork Co., Lancaster, Pa.
● Babcock & Wilcox Co., New York, N. Y.
Basic Refractories, Inc., Cleveland, O.
Bird-Archer Co., Philadelphia, Pa.

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- Botfield Refractories Co., Philadelphia, Pa.
- Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
- Chicago Fire Brick Co., Chicago, Ill.
- Ehret Magnesia Mfg. Co., Valley Forge, Pa.
- Fireline Stove & Furnace Lining Co., Chicago, Ill.
- General Insulating Products Co., Brooklyn, N. Y.
- Green Fire Brick Co., A. P., Mexico, Mo.
- ● Johns-Manville, New York, N. Y.
- Kellogg Co., M. W., The, New York, N. Y.
- Krehbiel Co., J. H., Chicago, Ill.
- Laclede-Christy Clay Products Co., St. Louis, Mo.
- McLeod & Henry Co., Inc., Troy, N. Y.
- Munn and Steel, Inc., Newark, N. J.
- Plibrico Jointless Firebrick Co., Chicago, Ill.
- Preferred Utilities Mfg. Corp., New York, N. Y.
- Pyrolite Products Co., Cleveland, O.
- Quigley Co., Inc., New York, N. Y.
- Ramtite Co., The, Chicago, Ill.
- Refractory & Insulation Corp., New York, N. Y.
- Rex Clay Products Co., Detroit, Mich.
- Robinson Insulation Co., Great Falls, Mont.
- Rutland Fire Clay Co., Rutland, Vt.
- Saverite Engineering Co., Hoboken, N. J.
- Standard Fuel Engineering Co., Detroit, Mich.
- Taylor Sons Co., Charles, Cincinnati, O.
- United States Stoneware Co., New York, N. Y.
- Universal Zonolite Insulation Co., Chicago, Ill.
- Walsh Refractories Corp., St. Louis, Mo.

REFRIGERANT DEHYDRATORS

See Dehydrators, Refrigerant

REFRIGERANT FILTERS

See Filters, Refrigerant

REFRIGERANT GAS PURGERS

See Purgers, Refrigerant Gas

REFRIGERANTS

- Ansul Chemical Co., Refrigeration Div. Marinette, Wis. (methyl chloride, sulphur dioxide)
- Armour Ammonia Wks., Chicago, Ill. (ammonia)
- Carbide and Carbon Chemicals Corp., New York, N. Y. (Butane, isobutane, propane, ethane)
- du Pont de Nemours & Co., Inc., E. I. Ammonia Dept. Wilmington, Del. (ammonia, sulphur dioxide, methyl chloride, "Freon")
- du Pont de Nemours & Co., Inc., E. I., Electrochemicals Dept., Wilmington, Del. (Methyl chloride and methylene chloride)
- ● Kinetic Chemicals, Inc., Wilmington, Del. ("Freon" fluorinated hydrocarbon refrigerants)
- Liquid Carbonic Corp., Chicago, Ill. (carbon dioxide)
- Pennsylvania Salt Mfg. Co., Philadelphia, Pa. (ammonia)
- Pure Carbonic, Inc., New York, N. Y. (carbon dioxide)
- Solvay Sales Corp., New York, N. Y.
- Virginia Smelting Co., West Norfolk, Va., (Methyl chloride, liquid sulphur dioxide, methylene chloride)

REFRIGERATING COMPRESSORS

See Compressors, Refrigerating

REFRIGERATION ACCUMULATORS

See Accumulators, Refrigeration

REFRIGERATION CONTROLS

See Valves, Refrigeration

REFRIGERATION FITTINGS

See Fittings, Refrigeration

REFRIGERATION MANIFOLDS

See Manifolds, Refrigeration

REFRIGERATION VALVES

See Valves, Refrigeration

REGISTERS

See also Diffusers; Grilles; Panels, Perforated, for Air Diffusion

- A-J Mfg. Co., Kansas City, Mo.
- Air Control Products, Inc., Coopersville, Mich.
- AirO-Fin Register Co., Detroit, Mich.
- ● Auer Register Co., Cleveland, O.
- ● Barber-Colman Co., Rockford, Ill.
- Best Register Co., Milwaukee, Wis.
- Char-Gale Mfg. Co., Minneapolis, Minn.
- Controlair Mfg. Co., Los Angeles, Calif.
- Diamond Mfg. Co., Wyoming, Pa.
- Eaglesfield Ventilator Co., Indianapolis, Ind. (wood)
- Empire Ventilation Equipment Co., Long Island City, N. Y.
- Hart & Cooley Mfg. Co., Holland, Mich.
- Hendrick Mfg. Co., Carbondale, Pa.
- ● Independent Register Co., Cleveland, O.
- Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
- Midco Register Corp., St. Paul, Minn.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Mueller Furnace Co., L. J., Milwaukee, Wis.
- Palmer Mfg. Corp., Phoenix, Ariz.
- Register & Grille, Mfg. Co., Brooklyn, N. Y.
- Rheem Mfg. Co., New York, N. Y.
- Rock Island Register Co., Rock Island, Ill.
- Smith Co., J. B., Philadelphia, Pa.
- ● Standard Stamping & Perforating Co., Chicago, Ill.
- Stewart Mfg. Co., Inc., Bloomfield, N. J.
- ● Titus Mfg. Corp., Waterloo, Ia.
- Turnbull Mfg. & Dist. Co., Detroit, Mich.
- ● Tuttle & Bailey, Inc., New Britain, Conn.
- United States Register Co., Battle Creek, Mich.
- Viking Mfg. Corp., Cleveland, O.

REGULATORS, AIR VELOCITY

- ● Barber-Colman Co., Rockford, Ill.
- ● Hays Corp., Michigan City, Ind.
- ● Johnson Service Co., Milwaukee, Wis.
- Powers Regulator Co., Chicago, Ill.
- Shallcross Controls, Inc., Milwaukee, Wis.
- Taylor Instrument Companies, Rochester, N. Y.

REGULATORS, DAMPER SETS

- Adams Co., The, Dubuque, Ia.
- Air Control Products, Inc., Coopersville, Mich.
- ● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
- ● Automatic Products Co., Milwaukee, Wis.
- ● Barber-Colman Co., Rockford, Ill.
- Cole-Sewell Engineering Co., St. Paul, Minn.
- Fossum, M. H., St. Paul, Minn.
- Gerett Corp., M. A., Milwaukee, Wis.
- Goese Mfg. Co., Milwaukee, Wis.
- Hart & Cooley Mfg. Co., Holland, Mich.
- Kerentoff, G. L., Cincinnati, O.
- Marcliff, Inc., Toledo, O.
- ● Mercoid Corp., The, Chicago, Ill.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Northern Weatherstrip Co., Duluth, Minn.
- Ohio Products Co., Cleveland, O.
- Parker-Kalon Corp., New York, N. Y.
- ● Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee, Wis.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Sarcotherm Controls, Inc., New York, N. Y.
- Shallcross Controls, Inc., Milwaukee, Wis.
- ● Trane Co., The, LaCrosse, Wis.
- United States Register Co., Battle Creek, Mich.
- ● White-Rodgers Electric Co., St. Louis, Mo.
- Young Regulator Co., Cleveland, O.

REGULATORS, DRAFT, COMBUSTION

- Askania Regulator Co., Chicago, Ill.
- Atlas Utilities Co., Providence, R. I.
- Automatic Products Co., Milwaukee, Wis.
- Bailey Meter Co., Cleveland, O.
- Boiler Room Equipment, Inc., New York, N. Y.
- Bristol Co., The, Waterbury, Conn.
- Brooke Engineering Co., Inc., Philadelphia, Pa.
- Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
- Campbell Engineering Co., Appleton, Wis.
- ● Cash Co., A. W., Decatur, Ill.
- Cole-Sewell Engineering Co., St. Paul, Minn.
- Davis Regulator Co., Chicago, Ill.
- Defender Instrument and Regulator Co., St. Louis, Mo.
- d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
- Engineer Co., New York, N. Y.
- Foster Wheeler Corp., New York, N. Y.
- Foxboro Co., Foxboro, Mass.
- Fuelguard Co., Dallas, Tex.
- General Power Plant Corp., New York, N. Y.
- ● Hagan Corp., Pittsburgh, Pa.
- ● Hays Corp., Michigan City, Ind.
- Hotstream Heater Co., Cleveland, O.
- ● Illinois Engineering Co., Chicago, Ill.
- ● Kieley & Mueller, Inc., North Bergen, N. J.
- Kol-Master Corp., Oregon, Ill.
- ● Krueger Sentry Gauge Co., Green Bay, Wis.
- Leeds & Northrup Co., Philadelphia, Pa.
- Locke Regulator Co., Salem, Mass.
- Mason-Neilan Regulator Co., Boston, Mass.
- ● Mercoid Corp., The, Chicago, Ill.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Perfex Corp., Milwaukee, Wis.
- Preferred Utilities Mfg. Corp., New York, N. Y.
- Republic Flow Meters Co., Chicago, Ill. (Industrial)
- Ruggles-Klingeman Mfg. Co., Salem, Mass.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Sarcotherm Controls, Inc., New York, N. Y.
- Schade Valve Mfg. Co., Philadelphia, Pa.
- Shallcross Controls, Inc., Milwaukee, Wis.
- Spence Engineering Co., Inc., Walden, N. Y.
- Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
- ● Webster Engineering Co., Tulsa, Okla.

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REGULATORS, LEVEL, LIQUID

Automatic Control Co., St. Paul, Minn.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Boylston Steam Specialty Co., Chicago, Ill.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Clayton Mfg. Co., El Monte, Calif.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
d'Este Div., American Chain & Cable Co., Reading, Pa.
● Fisher Governor Co., Marshalltown, Ia.
Foxboro Co., Foxboro, Mass.
Griscom-Russell Co., The, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
● Hays Corp., Michigan City, Ind.
● Johnson Corp., The, Three Rivers, Mich.
● Kieley & Mueller, Inc., North Bergen, N. J.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mason-Nielan Regulator Co., Boston, Mass.
● McDonnell & Miller, Inc., Chicago, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Northern Equipment Co., Erie, Pa.
Piezo Mfg. Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.

REGULATORS, PRESSURE, AIR

American Meter Co., Inc., New York, N. Y.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Inc., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
● Barber-Colman Co., Rockford, Ill.
Belfield Co., H., Philadelphia, Pa.
Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Baltimore, Md.
Boylston Steam Specialty Co., Chicago, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Clark Mfg. Co., Cleveland, O.
Clayton Mfg. Co., El Monte, Calif.
Conoflow Corp., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
DeVilbiss Co., The, Toledo, O.
Dockson Corp., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
Electric Sprayit Co., The, Sheboygan, Wis.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Greiner Co., Emil, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
● Hagan Corp., Pittsburgh, Pa.
● Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
● Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mason-Nielan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
Monitor Controller Co., The, Baltimore, Md.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
North Penn Co., New York, N. Y.
● Penn Electric Switch Co., Goshen, Ind.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
R-S Products Corp., Philadelphia, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Spray Engineering Co., Somerville, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Thermac Company, Los Angeles, Calif.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls Co., Boston, Mass.
Victor Equipment Co., San Francisco, Calif.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.

REGULATORS, PRESSURE, GAS

American Meter Co., Inc., New York, N. Y.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Inc., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
● Barber-Colman Co., Rockford, Ill.
Barber Gas Burner Co., Cleveland, O.
Belfield Co., H., Philadelphia, Pa.
Black Mfg. Co., The, Baltimore, Md.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Clayton Mfg. Co., El Monte, Calif.
Conoflow Corp., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
Dockson Corp., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
Eclipse Fuel Engineering Co., Rockford, Ill.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Fox Control & Mfg. Co., Cleveland, O.
Foxboro Co., Foxboro, Mass.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
● General Controls Co., Glendale, Calif.
Greiner Co., Emil, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
● Hagan Corp., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
● Hays Corp., Michigan City, Ind.
● Henry Valve Co., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Liquid Carbonic Corp., The, Chicago, Ill.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
Monitor Controller Co., The, Baltimore, Md.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Positive Control Co., The, Cincinnati, O.
Powers Regulator Co., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Ruggles Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Staples & Pfeiffer, San Francisco, Calif.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Victor Equipment Co., San Francisco, Calif.
Wall Chemicals Div. of The Liquid Carbonic Corp., Chicago, Ill.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.

REGULATORS, PRESSURE, HOT WATER HEATING SYSTEMS

Bailey Co., Chas., M., San Francisco, Calif.
● Barber-Colman Co., Rockford, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
Douglass Automatic Controls Co., South Gate, Calif.
● Fisher Governor Co., Marshalltown, Ia.
● Illinois Engineering Co., Chicago, Ill .

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Kainer Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Klipfel Mfg. Co., Hamilton, O.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
Mueller Co., Decatur, Ill.
Perfex Corp., Milwaukee, Wis.
● Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
Watts Regulator Co., Lawrence, Mass.
● White-Rodgers Electric Co., St. Louis, Mo.

REGULATORS, PRESSURE, LIQUID

Atlas Valve Co., Inc., Newark, N. J.
Automatic Control Co., St. Paul, Minn.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
● Barber-Colman Co., Rockford, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Belfield Co., H., Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Controller Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
Douglass Automatic Controls Co., South Gate, Calif.
Electrol, Inc., Kingston, N. Y.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Foxboro Co., Foxboro, Mass.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
● Hagan Corp., Pittsburgh, Pa.
● Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
● Henry Valve Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Justus Steam Trap Co., Napanoch, N. Y.
Keckley Co., O. C., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Monitor Controller Co., The, Baltimore, Md.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
Norgren Co., C. A., Denver, Colo.
Powers Regulator Co., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Staples & Pfeiffer, San Francisco, Calif.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls, Co., Boston, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
● White-Rodgers Electric Co., St. Louis, Mo.
Williams Gauge Co., The, Pittsburgh, Pa (Feed water)

REGULATORS, STATIC PRESSURE, AIR DUCT

Bailey Co., Chas. M., San Francisco, Calif.
● Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
● Cash Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
● Hays Corp., Michigan City, Ind.
Hotstream Heater Co., Cleveland, O.
● Johnson Service Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Chicago, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.

REGULATORS, TEMPERATURE

American Instrument Co., Silver Spring, Md.
Armstrong Control Co., Inc., Portland, Ore.
Atlas Valve Co., Inc., Newark, N. J.
● Autempco Corp., New York, N. Y.
● Automatic Devices Co., Chicago, Ill.
● Automatic Products Co., Milwaukee, Wis.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
● Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Burling Instrument Co., Newark, N. J.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Crise Mfg. Co., The, Columbus, O.
Crown Controls Co., Inc., New Bremen, O.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
● Detroit Lubricator Co., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
● Dunham Co., C. A., Chicago, Ill.
Eastern Engineering Co., New Haven, Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Electrimatic, Chicago, Ill.
Foster Engineering Co., Newark, N. J.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● General Controls Co., Glendale, Calif.
Gleason-Avery, Inc., Auburn, N. Y.
H-B Instrument Co., Philadelphia, Pa.
● Hagan Corp., Pittsburgh, Pa.
Hart Mfg. Co., The, Hartford, Conn.
● Hays Corp., Michigan City, Ind.
Heat Timer Corp., New York, N. Y.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Keckley Co., O. C., Chicago, Ill.
Klipfel Mfg. Co., Hamilton, O.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Leeds & Northrup Co., Philadelphia, Pa.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
McCorkle Co., D. H., Berkeley, Calif.
● Mercoid Corp., Chicago, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Pyrometer Instrument Co., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Spence Engineering Co., Inc., Walden, N. Y.
Spencer Thermostat Co., Attleboro, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
● Sterling, Inc., Milwaukee, Wis.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Boston, Mass.
Vapor Car Heating Co., Inc., Chicago, Ill.
Watson & McDaniel Co., Philadelphia, Pa.
Wheelco Instruments Co., Chicago, Ill.
White Mfg. Co., St. Paul, Minn.
● White-Rodgers Electric Co., St. Louis, Mo.

RELAYS, ELECTRICAL

Advance Electric and Relay Co., Los Angeles, Calif.
● Allen-Bradley Co., Milwaukee, Wis.
Allied Control Co., Inc., New York, N. Y.
American Gas Accumulator Co., Elizabeth, N. J. (time delay)
American Instrument Co., Silver Spring, Md.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
● Autempco Corp., New York, N. Y.
Automatic Electric Mfg. Co., Mankato, Minn.

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Automatic Switch Co., Orange, N. J.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
B/W Controller Corp., Birmingham, Mich.
● Barber-Colman Co., Rockford, Ill.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Clark Controller Co., Cleveland, O.
Consolidated Car Heating Co., Inc., Albany, N. Y.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cramer Co., Inc., R. W., The, Centerbrook, Conn.
Cutler-Hammer Inc., Milwaukee, Wis.
Davis & Co., Inc., Dean W., Kentland, Ind.
● Detroit Lubricator Co., Detroit, Mich.
Dunn, Inc., Struthers, Philadelphia, Pa.
Durakool, Inc., Elkhart, Ind.
Electro-Switch & Controls Co., Los Angeles, Calif.
Edison, Inc., Thos. A., Instrument Div., West Orange, N. J.
Electro-Switch & Controls Co., Los Angeles, Calif.
Ess Instrument Co., Bergenfield, N. J.
Friez Instrument Div., Bendix Aviation Corp., Towson, Baltimore, Md.
● General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Gleason-Avery, Inc., Auburn, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
H-B Instrument Co., Philadelphia, Pa.
Hart Mfg. Co., Hartford, Conn.
Industrial Engineering Corp., Terre Haute, Ind.
Leach Relay Co., Los Angeles, Calif.
McCorkle Co., D. H., Berkeley, Calif.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Baltimore, Md.
National Time & Signal Corp., Detroit, Mich.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
Potter & Brumfield Sales Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Reynolds Electric Co., Chicago, Ill.
Sampsel Time Control, Inc., Spring Valley, Ill.
Skaneateles Mfg. Co., Inc., Syracuse, N. Y.
Spencer Thermostat Co., Attleboro, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Struthers Dunn, Inc., Philadelphia, Pa.
Synchro-Start Products, Inc., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
● Thrush & Co., H. A., Peru, Ind.
Tork Clock Co., Inc., Mt. Vernon, N. Y.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Wallace & Tiernan Co., Inc., Newark, N. J.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Weston Electrical Instrument Corp., Newark, N. J.
● White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

RELIEF VALVES

See Valves, Relief

REPAIR CLAMPS

See Clamps, Pipe Repair

REPAIR PLUGS FOR TANKS

See Plugs, Repair, for Tanks

RESEATERS, VALVE

Chicago Specialty Mfg. Co., Chicago, Ill.
Economy Valve Seat Co., Chicago, Ill.
Independent Pneumatic Tool Co., Chicago, Ill.
Leavitt Machine Co., Orange, Mass.
Standard Reseater Corp., New York, N. Y.

REVERSE REFRIGERATION CYCLE UNITS

See Units, Air Conditioning, Reverse Refrigeration Cycle

RINGS, PISTON, FOR COMPRESSORS

McQuay-Norris Mfg. Co., St. Louis, Mo.
Perfect Circle Co., The, Hagerstown, Ind.
Piston Ring Div., Koppers Co., Inc., Baltimore, Md.
Sealed Power Corp., Muskegon, Mich.

RINGS, WELDING

Flori Pipe Co., The, St. Louis, Mo.
● Tube Turns, Inc., Louisville, Ky.
Wedge Protectors, Inc., Cleveland, O.

ROD, GAS WELDING

Air Reduction Sales Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
● American Brass Co., Waterbury, Conn.
American Steel & Wire Co., United States Steel Corp., Subsidiary, Cleveland, O.
Atlantic Steel Co., Atlanta, Ga.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Crucible Steel Co. of America, New York, N. Y.
Dow Chemical Co., The, Midland, Mich.
Duraloy Co., Scottdale, Pa. (Stainless)
Eutectic Welding Alloys Corp., New York, N. Y.
International Nickel Co., New York, N. Y.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
Milburn Co., Alexander, Baltimore, Md.
Mir-O-Col Alloy Co., Los Angeles, Calif.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
● Revere Cooper and Brass, Incorporated, New York, N. Y.
Sight Feed Generator Co., Richmond, Ind.
Universal Power Corp., Cleveland, O.
Victor Equipment Co., San Francisco, Calif.
● Youngstown Sheet & Tube Co., Youngstown, O.

ROLLER BEARINGS

See Bearings, Roller

ROOF COOLERS

See Systems, Roof Spraying

ROOF SPRAYING SYSTEMS

See Systems, Roof Spraying

ROOF VENTILATORS

See Ventilators, Roof

ROOM HUMIDIFIERS

See Humidifiers, Unit, Room Type; and Units, Air Conditioning, Winter

ROOM THERMOSTATS

See Thermostats, Room or Wall

ROTARY PUMPS

See Pumps, Rotary

RUBBER BELTING

See Belting, Flat, Rubber

RUBBER PACKING

See Packing, Rubber and Synthetic

RUBBER PIPE

See Pipe, Hard Rubber

SADDLE VALVES

See Valves, Saddle

SAFETY VALVES

See Valves, Safety, Steam

SCALE REMOVAL, CHEMICAL SERVICE FOR

Dowell Inc., Tulsa, Okla.
O'Brien Industries, Jersey City, N. J.

SCREENS, SUN REFLECTING

Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Kane Mfg. Corp., Kane, Pa.

SCREWS, SHEET METAL

● Aluminum Co. of America, Pittsburgh, Pa. (Aluminum)
American Screw Co., Providence, R. I.
Continental Screw Co., New Bedford, Mass.
Elco Tool & Screw Corp., Rockford, Ill.
Industrial Screw Co., Chicago, Ill.
National Lock Co., Inc., Rockford, Ill.
Parker-Kalon Corp., New York, N. Y.
Pheoll Mfg. Co., Chicago, Ill.
Rockford Screw Products Co., Rockford, Ill.
Shakeproof, Inc., Chicago, Ill.
United States Register Co., Battle Creek, Mich.

SEALS, SHAFT, MECHANICAL

Chicago Seal Co., Chicago, Ill.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Felt Products Mfg. Co., Chicago, Ill.

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Garlock Packing Co., Palmyra, N. Y.
Rotary Seal Co., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sealol Corp., Providence, R. I.
Syntron Co., Homer City, Pa.

SEAMLESS PIPE

See Pipe, Steel, Seamless

SEPARATORS, AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
Annis Air Filters, Glendale, Calif.
Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Baltimore, Md.
Bowser, Inc., Fort Wayne, Ind.
Centrifix Corp., Cleveland, O.
Clark Mfg. Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
DeVilbiss Co., The, Toledo, O.
● Dollinger Corp., Rochester, N. Y.
Drico Industrial Corp., New York, N. Y.
Gasflux Co., Mansfield, O.
Goodyer Industries, Inc., Chicago, Ill.
● Hagan Corp., Pittsburgh, Pa.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Corp., The, Three Rivers, Mich.
Keckley Co., O. C., Chicago, Ill.
Leavitt Machine Co., Orange, Mass.
Logan Engineering Co., Chicago, Ill.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Spencer Turbine Co., Hartford, Conn.
Spray Engineering Co., Somerville, Mass.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Textite Corp., Chicago, Ill.
Trerice Co., H. O., Detroit, Mich.
Wright-Austin Co., Detroit, Mich.

SEPARATORS, STEAM AND OIL

● Acme Industries, Inc., Jackson, Mich.
Adams Co., Inc., R. P., Buffalo, N. Y.
● American District Steam Co., North Tonawanda, N. Y.
Boylston Steam Specialty Co., Chicago, Ill.
Centrifix Corp., Cleveland, O. (Gas and Vapor)
Clark Mfg. Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Crane Co., Chicago, Ill.
Drico Industrial Corp., New York, N. Y.
Elliott Co., Jeannette, Pa.
● Fisher Governor Co., Marshalltown, Ia.
Flotrol Systems, Inc., Tulsa, Okla.
● Frick Co., Waynesboro, Pa.
Goodyer Industries, Inc., Chicago, Ill.
● Hagan Corp., Pittsburgh, Pa.
Hoppes Mfg. Co., Inc., Springfield, O.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Corp., The, Three Rivers, Mich.
● Kieley & Mueller, Inc., North Bergen, N. J.
Kisco Boiler & Engineering Co., St. Louis, Mo.
McAlear Mfg. Co., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
National Valve & Mfg. Co., Pittsburgh, Pa.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Schutte & Koerting Co., Philadelphia, Pa.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Temprite Products Corp., Detroit, Mich.
Textite Corp., Chicago, Ill.
Thermix Corp., The, Greenwich, Conn.
● Webster & Co., Warren, Camden, N. J.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
Wright-Austin Co., Detroit, Mich.

SEWAGE EJECTORS

See Ejectors, Sewage

SEWAGE PUMPS

See Pumps, Sewage

SHAFT SEALS, MECHANICAL

See Seals, Shaft, Mechanical

SHAFTS, FLEXIBLE, PUSH-PULL, FOR CONTROL

Arens Controls, Inc., Chicago, Ill.

SHEARS, ELECTRIC, PORTABLE

● Black & Decker Mfg. Co., Towson, Md.
C-B Tool Co., Lancaster, Pa.
G. D. S. Machinery & Supply Co., Inc., New York, N. Y.
Independent Pneumatic Tool Co., Chicago, Ill.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Skilsaw, Inc., Chicago, Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Stanley Works, The, New Britain, Conn.
Van Dorn Electric Tool Co., Towson, Md.

SHEARS, POWER

Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Inc., Cambridge City, Ind.
Bliss Co., E. W., Detroit, Mich.
Buckeye Tools Corp., Dayton, O.
● Buffalo Forge Co., Buffalo, N. Y.
Cincinnati Shaper Co., Cincinnati, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore, Beloit, Wis.
Marshalltown Mfg. Co., Marshalltown, Ia.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Parker Mfg. Co., Santa Monica, Calif.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Div., Whiting Corp., Harvey, Ill.
Rafter Machine Co., Inc., Belleville, N. J.
St. Louis Tool Co., St. Louis, Mo.
Whitney Metal Tool Co., Rockford, Ill.
Yoder Co., The, Cleveland, O.

SHEARS AND SNIPS, HAND

Armstrong-Blum Mfg. Co., Chicago, Ill.
Bartlett Mfg. Co., Detroit, Mich.
Beverly Throatless Shear Co., Chicago, Ill.
Bremil Mfg. Co., Erie, Pa.
Champion Blower & Forge Co., Lancaster, Pa.
Clauss Shear Co., Fremont, O.
Crescent Tool Co., Jamestown, N. Y.
Excelsior Tool & Machine Co., East St. Louis, Ill.
G. D. S. Machine & Supply Co., Inc., New York, N. Y.
Grobet File Corp. of America, New York, N. Y.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt. (Angle)
Klenk's Aviation Snips, Wilmington, Del.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Snap-On Tools Corp., Kenosha, Wis.
Viking Shear Co., Erie, Pa.
Whitney Metal Tool Co., Rockford, Ill.
Wiss & Sons Co., J., Newark, N. J.

SHEAVES

See Pulleys and Sheaves, for Belt Drives

SHEET METAL BRAKES

See Brakes, Sheet Metal

SHEET METAL DUCTS

See Ducts and Duct Fittings, Prefabricated

SHEET METAL FITTINGS

See Ducts and Duct Fittings, Prefabricated

SHEET METAL PUNCHES

See Punches, Sheet Metal

SHEETS, ALUMINUM

● Aluminum Co. of America, Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Fairmont Aluminum Co., Fairmont, W. Va.
● Permanente Products Co., Oakland, Calif.
● Reynolds Metals Co., Richmond, Va.

SHEETS, ALUMINUM COATED

● American Rolling Mill Co., The, Middletown, O.

SHEETS AND BOARD, NON-METALLIC, FOR DUCT CONSTRUCTION

Carey Mfg. Co., Philip, Cincinnati, O.
Celotex Corp., The, Chicago, Ill.
● Grant Wilson, Inc., Chicago, Ill.
● Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Keystone Asphalt Products Co., Chicago, Ill.
Ruberoid Co., New York, N. Y.

Sall Mountain Co., Chicago, Ill.
Technical Ply-Woods, Chicago, Ill.
United States Gypsum Co., Chicago, Ill.
● Wilson, Inc., Grant, Chicago, Ill.

SHEETS, CLAD

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
● Aluminum Co. of America, Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill.
● American Rolling Mill Co., The, Middletown, O.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Follansbee Steel Corp., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill. (Stainless)
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Lamb & Ritchie Co., Cambridge, Mass.
Lukens Steel Co. and Divisions, Coatesville, Pa.

SHEETS, COPPER

● American Brass Co., Waterbury, Conn.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Hussey & Co., C. G., Pittsburgh, Pa.
Klauer Mfg. Co., Dubuque, Ia.
New Haven Copper Co., Seymour, Conn.
● Revere Copper and Brass, Incorporated, New York, N. Y.
● Weirton Steel Co., Weirton, W. Va.
Western Brass Mills, Div. of Olin Industries, Inc., East Alton, Ill. (Brass, bronze, phosphor bronze)

SHEETS, LEAD

Alpha Metals, Inc., Brooklyn, N. Y.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Continental Steel Corp., Kokomo, Ind. (Coated)
Eagle-Picher Co., Cincinnati, O.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Illinois Zinc Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Wks., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
● Weirton Steel Co., Weirton, W. Va. (Alloy coated)

SHEETS, MAGNESIUM ALLOY

Dow Chemical Co., The, Midland, Mich.
● Revere Copper and Brass, Incorporated, New York, N. Y.

SHEETS, METAL, WITH PROTECTIVE NON-METALLIC COATING

American Nickeloid Co., Peru, Ill.
American Steel Band Co., Heidelberg, Pa.
Cheney Metal Products Co., Trenton, N. J.
Koppers Co., Inc., Bartlett-Hayward Div., Baltimore, Md.
Plasteel Products Co., Washington, Pa.
Technical Ply-Woods, Chicago, Ill. (Metal and plywood)

SHEETS, NICKEL AND NICKEL ALLOY

American Nickeloid Co., Peru, Ill.
International Nickel Co., New York, N. Y.
Lukens Steel Co. and Divisions, Coatesville, Pa.
● Revere Copper and Brass Incorporated, New York, N. Y.
Robertson Co., H. H., Pittsburgh, Pa.
Western Brass Mills, Div. of Olin Industries, Inc., East Alton, Ill.

SHEETS, STEEL, COPPER BEARING

● American Rolling Mill Co., The, Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
● Bethlehem Steel Co., Bethlehem, Pa.
● Carnegie-Illinois Steel Corp., (Sub. United States Steel Corp.), Pittsburgh, Pa.
● Columbia Steel Co. (Sub. United States Steel Corp.), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Follansbee Steel Corp., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Lyon, Conklin & Co., Inc., Baltimore, Md. (Chromium, nickel, copper, iron alloy)
Newport Rolling Mill Co., Div. of International Detrola Corp., Newport, Ky.
Reeves Steel & Mfg. Co., Dover, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Superior Sheet Steel Co., The, Div. of Borg-Warner Corp., Canton, O.
● Tennessee Coal, Iron & Railroad Co., United States Steel Corp., Subsidiary, Birmingham, Ala.
● Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
● Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, STEEL, GALVANIZED

● American Rolling Mill Co., The, Middletown, O.
Apollo Steel Co., Apollo, Pa.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
● Bethlehem Steel Co., Bethlehem, Pa.
● Carnegie-Illinois Steel Corp., (Sub. United States Steel Corp.), Pittsburgh, Pa.
● Columbia Steel Co. (Sub. United States Steel Corp.), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Empire Sheet & Tin Plate Co., Mansfield, O.
Follansbee Steel Corp., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Detroit, Mich.
Inland Steel Co., Chicago, Ill.
Klauer Mfg. Co., Dubuque, Ia.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Newport Rolling Mill Co., Div. of International Detrola Corp., Newport, Ky.
Niles Rolling Mill Co., Niles, O.
Reeves Steel & Mfg. Co., Dover, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Superior Sheet Steel Co., The, Div. of Borg-Warner Corp., Canton, O.
● Tennessee Coal, Iron & Railroad Co., United States Steel Corp., Subsidiary, Birmingham, Ala.
● Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wood Steel Co., Alan, Conshohocken, Pa.

SHEETS, STEEL, GALVANNEALED

Berger Mfg. Div., Republic Steel Corp., Canton, O.
● Carnegie-Illinois Steel Corp., (Sub. United States Steel Corp.), Pittsburgh, Pa.
Continental Steel Corp., Kokomo, Ind.
Newport Rolling Mill Co., Div. of International Detrola Corp., Newport, Ky.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Superior Sheet Steel Co., The, Div. of Borg-Warner Corp., Canton, O.

SHEETS, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
● American Rolling Mill Co., The, Middletown, O.
● Carnegie-Illinois Steel Corp., (Sub. United States Steel Corp.), Pittsburgh, Pa.
Crucible Steel Co. of America, New York, N. Y.
Eastern Stainless Steel Corp., Baltimore, Md.
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Superior Steel Corp., Pittsburgh, Pa.
● Tennessee Coal, Iron & Railroad Co., United States Steel Corp., Subsidiary, Birmingham, Ala.
Universal Cyclops Steel Corp., Bridgeville, Pa.
Washington Steel Corp., Washington, Pa.

SHEETS, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

SHEETS, ZINC

American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
American Zinc Products Co., Greencastle, Ind.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Hegeler Zinc Co., Danville, Ill.
Illinois Zinc Co., Chicago, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Sales Co., New York, N. Y.

SHUTTERS

See Louvers and Shutters

SIGHT GLASSES

See Glasses, Sight, for Pipe Lines

SLEEVE BEARINGS

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SLEEVES, PIPE REPAIR

See Clamps, Pipe Repair

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SLIME AND ALGAE CONTROL, WATER TREATMENT FOR

See Treatment, Water, for Slime and Algae Control

SMOKE ALARMS

See Alarms, Smoke

SMOKE GUNS

See Guns and Pots, Smoke and Smudge

SMUDGE POTS

See Guns and Pots, Smoke and Smudge

SOCKET WRENCHES

See Wrenches, Socket

SOFTENERS, WATER

American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Bogue Electric Co., Paterson, N. J.
Elgin Softener Corp., Elgin, Ill.
Cochrane Corp., Philadelphia, Pa.
Liquid Conditioning Corp., Linden, N. J.
MacDermid Chemical Co., Bristol, Conn.
Permutit Co., New York, N. Y.
Red Jacket Mfg. Co., Davenport, Ia.
Research Products Corp., Madison, Wis.
Uniflow Mfg. Co., Erie, Pa.
Warlo Corp., New York, N. Y.

SOLAR HEAT RESISTING SCREENS

See Screens, Sun Reflecting

SOLDER (SILVER), BRAZING ALLOYS, AND FLUXES

Air Reduction Sales Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Atkins & Co., E. C., Indianapolis, Ind.
Baker & Co., Inc., Newark, N. J.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Eutectic Welding Alloys Corp., New York, N. Y.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Handy & Harman, New York, N. Y.
Hardy, Inc., Charles, New York, N. Y.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Mueller Brass Co., Port Huron, Mich.
National Cylinder Gas Co., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Special Chemicals Corp., New York, N. Y.
Sulflo, Inc., Elizabeth, N. J.

SOLDER (TIN-LEAD), AND FLUXES

Air Reduction Sales Co., New York, N. Y.
Alpha Metals, Inc., Brooklyn, N. Y.
Alsoco Corp., New York, N. Y. (Aluminum solder)
● American Brass Co., Waterbury, Conn.
American Solder & Flux Co., Philadelphia, Pa.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Benson Co., Inc., Alex R., Hudson, N. Y.
Burnley Battery & Mfg. Co., North East, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Eagle-Picher Co., Cincinnati, O.
Eutectic Welding Alloys Corp., New York, N. Y.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Galv-Weld Products, Dayton, O.
Gardiner Metal Co., Chicago, Ill.
Glaser Lead Co., Inc., Brooklyn, N. Y.
Hercules Chemical Co., Inc., New York, N. Y.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Johnston Tin Foil & Metal Co., The, St. Louis, Mo.
Kester Solder Co., Chicago, Ill.
Klauer Mfg. Co., Dubuque, Ia.
Lake Chemical Co., Chicago, Ill.
Lenk Mfg. Co., Boston, Mass.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
Merchant & Evans Co., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Paul-Lewis Laboratories, Inc., Milwaukee, Wis.
Powder Weld Process Co., The, Brooklyn, N. Y.
Rochester Lead Works, Inc., Rochester, N. Y.
Ruby Chemical Co., Columbus, O.
Special Chemicals Corp., New York, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn, N. Y.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

SOLENOIDS AND SOLENOID COILS

● Allen-Bradley Co., Milwaukee, Wis.
Automatic Switch Co., Orange, N. J.
● Barber-Colman Co., Rockford, Ill.
Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis & Co., Inc., Dean W., Kentland, Ind.
Electric Controller & Mfg. Co., Cleveland, O.
Essex Wire Corp., Div. of, Detroit, Mich.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Jefferson Electric Co., Bellwood, Ill.
National Acme Co., The, Cleveland, O.
Soreng Mfg. Co., Chicago, Ill.
Supreme Electric Products Corp., Rochester, N. Y.
Trombetta Solenoid Co., Milwaukee, Wis.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
West Coast Electrical Mfg. Co., Los Angeles, Calif.

SOLENOID VALVES

See Valves, Solenoid

SOOT BLOWERS

See Blowers, Soot

SOOT DESTROYERS

See Destroyers, Soot, Chemical

SOUND DEADENING FOR CEILING AND WALL

See Insulation, Ceiling and Wall, Sound Deadening

SOUND DEADENING FOR DUCTS

See Insulation, Duct, Sound Deadening

SOUND INDICATORS

See Indicators, Sound Level

SPARGER NOZZLES

See Nozzles, Sparger, for Tank Heating

SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical

SPEED REDUCERS

See Reducers, Speed

SPIRAL PIPE

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SPOT WELDERS

See Welders, Spot

SPRAY HUMIDIFIERS

See Humidifiers, Direct, Spray Head

SPRAY NOZZLES

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SPRAY PAINTING BOOTHS

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SPRINKLER HEADS

See Heads, Sprinkler

SPRINKLER SYSTEM CONTROLS

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STAINLESS STEEL PIPE

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STAINLESS STEEL SHEETS

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STANDS, PIPE VISE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Crown Die & Tool Co., Chicago, Ill.
Martin & Sons, H. P., Owensboro, Ky.
Nye Tool & Machine Co., Chicago, Ill.
● Ridge Tool Co., Elyria, O.
Western Wire Products Co., St. Louis, Mo.
● Williams & Co., J. H., Buffalo, N. Y.

STEAM BOOSTER COMPRESSORS

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STEAM ENGINES

See Engines, Steam

STEAM JET HEATERS

See Heaters, Steam Jet, for Liquids

STEAM JET REFRIGERATION

See Compressors, Refrigerating, Steam Jet

STEAM PRESSURE REGULATORS

See Valves, Pressure Reducing and Regulating

STEAM PUMPS

See Pumps, Steam

STEAM SEPARATORS

See Separators, Steam and Oil

STEAM TRAPS

See Traps, Steam

STEEL PIPE

See Pipe, Steel

STEEL TUBE FITTINGS, FLARED

See Fittings, Steel Tube, Flared

STEEL TUBING

See Tubing, Steel

STEEL UNIONS

See Unions, Steel

STEEL VALVES

See Valves, Gate; and Valves, Globe

STERILIZING LAMPS

See Lamps, Sterilizing, for Duct Installation

STERILIZING UNITS

See Units, Sterilizing, Air

STOCKS AND DIES

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Champion Blower & Forge Co., Lancaster, Pa.
Crown Die & Tool Co., Chicago, Ill. (Pipe)
Erie Tool Wks., Erie, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hollands Mfg. Co., Erie, Pa.
Nye Tool & Machine Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
● Ridge Tool Co., Elyria, O.
Threadwell Tap & Die Co., Greenfield, Mass.
Toledo Pipe Threading Machine Co., Toledo, O.

STOKERS, INDUSTRIAL AND COMMERCIAL

61 to 1200 Lb per Hr

Allen Stoker Co., Allentown, Pa.
Allington & Curtis Mfg. Co., Saginaw, Mich. (For shavings, chips and sawdust)
American Coal Burner Co., Chicago, Ill.
American Engineering Co., Philadelphia, Pa.
Anchor Stove & Range Co., New Albany, Ind.
Auburn Burner Co., Auburn, Ind.
Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
Automatic Firing Corp., St. Louis, Mo.
● Babcock & Wilcox Co., New York, N. Y.
Bros. Boiler & Mfg. Co., Wm., Minneapolis, Minn.
● Brownell Co., Dayton, O.
Burke Stoker & Mfg. Co., Chicago, Ill.
Burnham Stoker Co., Vancouver, Wash.
Canton Stoker Corp., Canton, O.
Carnes, Inc., John R., Lima, O.
Carpenter Heating & Stoker Co., Cleveland, O.
Central Rubber & Steel Corp., Findlay, O.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Combustion Engineering Co., Inc., New York, N. Y.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Detroit Stoker Co., Detroit, Mich.
Diamond Iron Works, Inc., Minneapolis, Minn.
Econocol Stoker Div. of Cotta Transmission Co., Rockford, Ill.
Eddy Stoker Corp., Chicago, Ill.
Erie City Iron Works, Erie, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Fire-King Stoker Co., Indianapolis, Ind.
Firemood Machine Wks., Converse, Ind.
Frederick Iron & Steel Co., Frederick, Md.
Flynn & Emrich Co., Baltimore, Md.
Freeman Stoker Div., Illinois Iron & Bolt Co., Chicago, Ill.
Fuel Savers, Inc., Harrisburg, Pa.
Gehl Bros. Mfg. Co., West Bend, Wis.
General Machinery Co., Spokane, Wash.
Gunnite Foundries Corp., Rockford, Ill. (Screws)
Heating Assurance, Inc., Spokane, Wash.
Her-Born Engrg. & Mfg. Co., Sandusky, O.
Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.
Hoffman Combustion Engineering Co., Detroit, Mich.
Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
International Engineering Wks., Inc., Framingham, Mass.
Iron Fireman Mfg. Co., Cleveland, O.
Johnston & Jennings Co., Cleveland, O.
Kingston Products Corp., Kokomo, Ind.
Kol-Master Corp., Oregon, Ill.
Laclede Stoker Co., St. Louis, Mo.
Leffel & Co., Springfield, O.
Link-Belt Co., Chicago, Ill.
"Loyal Knight" Stokers, Inc., Belleville, Ill.
Mallory Sales Co., Dolton, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Muncie Gear Wks., Inc., Muncie, Ind.
National Steam Pump Co., Upper Sandusky, O.
Newcomb Engineering Co., Grand Rapids, Mich.
Northern Steel & Stoker Corp., Peoria, Ill.
Ormsby-Osterman, Inc., St. Louis, Mo.
OverSpred Stoker Co., Chicago, Ill.
Peerless Mfg. Corp., Louisville, Ky.
Plymouth Industries, Inc., Plymouth, Ind.
Pocahontas Fuel Co., Inc., Stoker Div., Cleveland, O.
Rheem Mfg. Co., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Sinker-Davis Co., Indianapolis, Ind.
Steel Products Engineering Co., Springfield, O.
Stokol-Stoker, Indianapolis, Ind.
Sun-Fire Stoker Corp., New Albany, Ind.
Thermal Engineering Co., Chicago, Ill.
U. S. Machine Corp., Lebanon, Ind.
Whiting Stoker Sales Co., Chicago, Ill.
Whitty Co., Inc., Boston, Mass.
Will-Burt Co., The, Orrville, O.

STONEWARE PIPE

See Pipe, Stoneware

STORAGE WATER HEATERS

See Heaters, Water, Steam, Storage

STRAINERS, PIPE LINE

● Alco Valve Co., St. Louis, Mo.
Alten's Foundry & Machine Works, Lancaster, O.
● American District Steam Co., North Tonawanda, N. Y.
Andale Co., Philadelphia, Pa.
● Anderson Co., V. D., The, Cleveland, O.
Barrett, Haentjens & Co., Hazleton, Pa.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Blackmer Pump Co., Grand Rapids, Mich.
Bowser, Inc., Fort Wayne, Ind.
Boylston Steam Specialty Co., Chicago, Ill.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Cashin Co., W. D., Boston, Mass.
Clark Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Cuno Engineering Corp., Meriden, Conn.
Davis Regulator Co., Chicago, Ill.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
Drico Industrial Corp., New York, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Electrimatic, Chicago, Ill.
Elliott Co., Jeannette, Pa.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Foster Pump Works, Inc., Brooklyn, N. Y.
● General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.

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● Henry Valve Co., Chicago, Ill.
● Hoffman Specialty Co., Indianapolis, Ind.
Hubbell Corp., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
● Kieley & Mueller, Inc., North Bergen, N. J.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Leslie Co., Lyndhurst, N. J.
● Maid-O'-Mist, Inc., Chicago, Ill.
Manufacturers Fin Coil Co., Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Long Island City, N. Y.
Newark Wire Cloth Co., Newark, N. J.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
OPW Corp., Cincinnati, O.
Phillips & Co., H. A., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
● Sarco Co., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Sheffler-Gross Co., Philadelphia, Pa.
Spence Engineering Co., Walden, N. Y.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Chicago, Ill.
Standard Machine & Mfg. Co., St. Louis, Mo.
Staples & Pfeiffer, San Francisco, Calif.
● Sterling, Inc., Milwaukee, Wis.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
● Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Rotary Power Co., East Dedham, Mass.
Tryco Products, Inc., Westfield, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
● Webster & Co., Warren, Camden, N. J.
Webster Electric Co., Racine, Wis. (For oil burners)
Winslow Engineering Co., Oakland, Calif.
Wright-Austin Co., Detroit, Mich.
● Yarnall-Waring Co., Philadelphia, Pa.

STRESS RELIEVERS

See Preheaters and Stress Relievers, Electric, for Pipe Welds

STRIP HEATERS

See Heaters, Strip and Immersion, Electric

STRUCTURAL SHAPES

See Angles, Bars, Beams, Channels and Tees

STUD WELDERS

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SUCTION LINE HEAT EXCHANGERS

See Exchangers, Heat, Refrigerant Suction Line

SUMP PUMPS

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SUPERHEATERS, PROCESS STEAM

● Babcock & Wilcox Co., New York, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Combustion Engineering Co., Inc., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Edge Moor Iron Works, Inc., Edge Moor, Del.
Ewing Mfg. Co., Oklahoma City, Okla.
Foster Wheeler Corp., New York, N. Y.
Goodyer Industries, Inc., Chicago, Ill.
Selas Corp. of America, Philadelphia, Pa.
Springfield Boiler Co., Springfield, Ill.

SURFACE, FINNED, COOLING, BRINE

● Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.
American Blower Corp., Detroit, Mich.
Beacon-Morris Corp., Boston, Mass.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., Hartford, Conn.
Conditionaire Unit Co., Chicago, Ill.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc, Los Angeles, Calif.
● Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.
G. & O. Mfg. Co., New Haven, Conn.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Griscom-Russell Co., The, New York, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
● McQuay, Inc., Minneapolis, Minn.
● Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning C
Inc., Brooklyn, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Wolverine Tube Div. of Calumet and Hecla Consolidated Copper C
Detroit, Mich.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, COLD WATER

● Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.
Airtemp, Div. of Chrysler Corp., Dayton, O.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Beacon-Morris Corp., Boston, Mass.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Conditionaire Unit Co., Chicago, Ill.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
● Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
G. & O. Mfg. Co., New Haven, Conn.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis
Griscom-Russell Co., The, New York, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
Manufacturers Fin Coil Co., Chicago, Ill.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
● McQuay, Inc., Minneapolis, Minn.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
● Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Palmer Mfg. Corp., Phoenix, Ariz.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning C
Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Wing Mfg. Co., L. J., New York, N. Y.
X L Refrigerating Co., Chicago, Ill.
● Yates-American Machine Co., Beloit, Wis.
● York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, DIRECT EXPANSION

● Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.

● Advertisement in this issue. See Index to Advertisers, page 416

Airtemp Div. of Chrysler Corp., Dayton, O.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Beacon-Morris Corp., Boston, Mass.
Betz Corp., Hammond, Ind.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., Hartford, Conn.
Conditionaire Unit Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
● Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
G. & O. Mfg. Co., New Haven, Conn.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Griscom-Russell Co., The, New York, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
Manufacturers Fin Coil Co., Chicago, Ill.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
● McQuay, Inc., Minneapolis, Minn.
● Merchant & Evans Co., Philadelphia, Pa.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.
X L Refrigerating Co., Chicago, Ill.
● Yates-American Machine Co., Beloit, Wis.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

SURFACE, FINNED, HEATING, INDIRECT, FERROUS

Bayley Blower Co., Milwaukee, Wis.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Brown Fintube Co., The, Elyria, O.
Campbell Heating Co., E. K., Kansas City, Mo.
Conditionaire Unit Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
● Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.
G. & O. Mfg. Co., New Haven, Conn.
Goodyer Industries, Inc., Chicago, Ill.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicagfo, Ill.
Manufacturers Fin Coil Co., Chicago, Ill.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
● Vulcan Radiator Co., Hartford, Conn.
Westinghouse Electric Corp., Pittsburgh, Pa.

SURFACE, FINNED, HEATING, INDIRECT, NON-FERROUS

Aerofin Corp., Syracuse, N. Y.
● Airtherm Mfg. Co., St. Louis, Mo.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Bayley Blower Co., Milwaukee, Wis.
Beacon-Morris Corp., Boston, Mass.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bohn Aluminum & Brass Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
● Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
G. & O. Mfg. Co., New Haven, Conn.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Goodyer Industries, Inc., Chicago, Ill.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Atlanta, Ga.
Manufacturers Fin Coil Co., Chicago, Ill.
● Marlo Coil Co., St. Louis, Mo.
● McCord Corp., Detroit, Mich.
● McQuay, Inc., Minneapolis, Minn.
● Modine Mfg. Co., Racine, Wis.
● Murray Mfg. Co., D. J., Wausau, Wis.
● Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Vulcan Radiator Co., Hartford, Conn.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Wing Mfg. Co., L. J., New York, N. Y.
● Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

SURFACE THERMOSTATS

See Thermostats, Surface

SWING JOINTS

See Joints, Pipe, Flexible Swing and Revolving

SWITCHES, ELECTRICAL

Acro Electric Co., Cleveland, O.
Adam Electric Co., Frank, St. Louis, Mo.
Aerotec Corp., The, Greenwich, Conn.
● Allen-Bradley Co., Milwaukee, Wis.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Automatic Switch Co., Orange, N. J.
● Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland, O.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Congress Fan & Electric Co., Daytona Beach, Fla.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Delta-Star Electric Co., Chicago, Ill.
Dunn, Inc., Struthers, Philadelphia, Pa.
Electric Controller & Mfg. Co., Cleveland, O.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Electro-Switch & Controls Co., Los Angeles, Calif.
● General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Hart Mfg. Co., Hartford, Conn.
Martens & Stormoen, Boston, Mass.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
Micro Switch Div. of First Industrial Corp., Freeport, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Baltimore, Md.
Morse-Smith-Morse, Inc., Watertown, Mass.
● Penn Electric Switch Co., Goshen, Ind.
Soreng Mfg. Co., Chicago, Ill.
Square D Co., Detroit, Mich.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Struthers Dunn, Inc., Philadelphia, Pa.
Thermix Corp., The, Greenwich, Conn.
Tork Clock Co., Inc., Mount Vernon, N. Y.
Trumbull Electric Mfg. Co., The, Plainville, Conn.
Walton Co., Hartford, Conn. (Foot)
Ward Leonard Electric Co., Mount Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
White Mfg. Co., St. Paul, Minn.
● White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

SWITCHES, FLOAT, REFRIGERATION

● Alco Valve Co., St. Louis, Mo.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Clark Controller Co., Cleveland, O.
● Frick Co., Waynesboro, Pa.
Magnetrol, Inc., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
● Mercoid Corp., The, Chicago, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Thermix Corp., The, Greenwich, Conn.

SWITCHES, FLOW

Cooper Co., Clark, Palmyra, N. J.
Drying Systems, Inc., Chicago, Ill.

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- Fischer & Porter Co., Hatboro, Pa.
- ● General Controls Co., Glendale, Calif.
- Magnetrol, Inc., Chicago, Ill.
- ● McDonnell & Miller, Inc., Chicago, Ill.
- Thermix Corp., The, Greenwich, Conn.

SWITCHES, LIQUID LEVEL

- ● Alco Valve Co., St. Louis, Mo.
- ● Allen-Bradley Co., Milwaukee, Wis.
- Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
- Automatic Control Co., St. Paul, Minn.
- B/W Controller Corp., Birmingham, Mich.
- Bennett Oil Co., Omaha, Neb.
- Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
- Cook Electric Co., Diaphlex Div., Chicago, Ill.
- Cooper Co., Clark, Palmyra, N. J.
- Cutler-Hammer, Inc., Milwaukee, Wis.
- ● Detroit Lubricator Co., Detroit, Mich.
- ● General Controls Co., Glendale, Calif.
- General Electric Co., Apparatus Dept., Schenectady, N. Y.
- Healy Ruff Co., St. Paul, Minn.
- Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
- Kisco Boiler & Engineering Co., St. Louis, Mo.
- Magnetrol Inc., Chicago, Ill.
- McAlear Mfg. Co., Chicago, Ill.
- ● McDonnell & Miller, Inc., Chicago, Ill.
- ● Mercoid Corp., Chicago, Ill.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Monitor Controller Co., The, Baltimore, Md.
- Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
- ● Penn Electric Switch Co., Goshen, Ind.
- Photoswitch, Inc., Cambridge, Mass.
- Ruggles-Klingemann Mfg. Co., Salem, Mass.
- ● Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
- Square D Co., Industrial Controller Div., Milwaukee, Wis.
- ● Stephens-Adamson Mfg. Co., Aurora, Ill.
- Thermix Corp., The, Greenwich, Conn.
- United Cinephone Corp., Torrington, Conn.
- Westinghouse Electric Corp., Pittsburgh, Pa.

SWITCHES, MERCURY

- Automatic Temperature Control Co., Inc., Philadelphia, Pa.
- Durakool, Inc., Elkhart, Ind.
- General Electric Co., Apparatus Dept., Schenectady, N. Y.
- Hart Mfg. Co., Hartford, Conn.
- ● Mercoid Corp., Chicago, Ill.
- Mercontrol Inc., New York, N. Y.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Newark Boiler Regulator Co., Inc., Bloomfield, N. J.

SWITCHES, PRESSURE AND VACUUM

- Aerotec Corp., The, Greenwich, Conn.
- ● Allen-Bradley Co., Milwaukee, Wis.
- ● Autempco Corp., New York, N. Y.
- Automatic Control Co., St. Paul, Minn.
- ● Barber-Colman Co., Rockford, Ill.
- Clark Controller Co., Cleveland, O.
- Cook Electric Co., Diaphlex Div., Chicago, Ill.
- Cooper Co., Clark, Palmyra, N. J.
- Cutler-Hammer, Inc., Milwaukee, Wis.
- ● Detroit Lubricator Co., Detroit, Mich.
- General Electric Co., Apparatus Dept., Schenectady, N. Y.
- Giannini Co., Inc., G. M., Pasadena, Calif.
- Gleason-Avery, Inc., Auburn, N. Y.
- Healy Ruff Co., St. Paul, Minn.
- Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
- Meletron Corp., Los Angeles, Calif.
- ● Mercoid Corp., Chicago, Ill.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- Monitor Controller Co., The, Baltimore, Md.
- Newark Boiler Regulator Co., Inc., Bloomfield, N. J.
- ● Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee, Wis.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Shallcross Controls, Inc., Milwaukee, Wis.
- Skaneateles Mfg. Co., Inc., Syracuse, N. Y.
- Square D Co., Industrial Controller Div., Milwaukee, Wis.
- Thermix Corp., The, Greenwich, Conn.
- Vapor Car Heating Co., Inc., Chicago, Ill.
- Westinghouse Electric Corp., Pittsburgh, Pa.
- ● White-Rodgers Electric Co., St. Louis, Mo.

SWITCHES, TIME

- ● Allen-Bradley Co., Milwaukee, Wis.
- American Gas Accumulator Co., Elizabeth, N. J.
- ● Autempco Corp., New York, N. Y.
- ● Automatic Devices Co., Chicago, Ill.
- Automatic Electric Mfg. Co., Mankato, Minn.
- Automatic Temperature Control Co., Inc., Philadelphia, Pa.
- ● Barber-Colman Co., Rockford, Ill.
- Cooper Co., Clark, Palmyra, N. J.
- Cramer Co., Inc., R. W., The, Centerbrook, Conn.
- Electro-Switch & Controls Co., Los Angeles, Calif.
- General Electric Co., Apparatus Dept., Schenectady, N. Y.
- Gleason-Avery, Inc., Auburn, N. Y.
- Hansen Mfg. Co., Princeton, Ind. (timing motors and time machine)
- Healy Ruff Co., St. Paul, Minn.
- Heat Timer Corp., New York, N. Y.
- Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
- Industrial Engineering Corp., Terre Haute, Ind.
- International Register Co., Chicago, Ill.
- Landis & Gyr, Inc., New York, N. Y.
- ● Mercoid Corp., Chicago, Ill.
- Miller-Harris Instrument Co., Milwaukee, Wis.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- National Time & Signal Corp., Detroit, Mich.
- Paragon Electric Co., Two Rivers, Wis.
- ● Penn Electric Switch Co., Goshen, Ind.
- Perfex Corp., Milwaukee, Wis.
- Photoswitch, Inc., Cambridge, Mass.
- Reliance Automatic Lighting Co., Racine, Wis.
- Reynolds Electric Co., Chicago, Ill.
- Rhodes, Inc., M. H., Hartford, Conn.
- Sampsel Time Control, Inc., Spring Valley, Ill.
- Sangamo Electric Co., Springfield, Ill.
- Telechron, Inc., Ashland, Mass.
- Tork Clock Co., Inc., Mount Vernon, N. Y.
- Ward Leonard Electric Co., Mount Vernon, N. Y.
- Westinghouse Electric Corp., Pittsburgh, Pa.
- ● White-Rodgers Electric Co., St. Louis, Mo.
- Zenith Electric Co., Chicago, Ill.

SWIVEL PIPE COUPLINGS

See Joints, Pipe, Flexible Swing and Revolving

SYSTEMS, COMBUSTION CONTROL

- Askania Regulator Co., Chicago, Ill.
- Bailey Meter Co., Cleveland, O.
- Bowser, Inc., Fort Wayne, Ind.
- Bristol Co., Waterbury, Conn.
- Brooke Engineering Co., Inc., Philadelphia, Pa.
- ● Cash Co., A. W., Decatur, Ill.
- Combustion Control Corp., Cambridge, Mass.
- Engineer Co., New York, N. Y.
- Ess Instrument Co., Bergenfield, N. J.
- General Power Plant Corp., New York, N. Y.
- ● Hagan Corp., Pittsburgh, Pa.
- ● Hays Corp., Michigan City, Ind.
- Hotstream Heater Co., Cleveland, O.
- ● Illinois Engineering Co., Chicago, Ill.
- Leeds & Northrup Co., Philadelphia, Pa.
- ● Mercoid Corp., Chicago, Ill.
- Perfex Corp., Milwaukee, Wis.
- Republic Flow Meters Co., Chicago, Ill.
- Ruggles-Klingemann Mfg. Co., Salem, Mass.
- Selas Corp. of America, Philadelphia, Pa.
- Shallcross Controls, Inc., Milwaukee, Wis.

SYSTEMS, HEATING, HOT WATER

- ● Barber-Colman Co., Rockford, Ill.
- ● Bell & Gossett Co., Morton Grove, Ill.
- Cash Valve Mfg. Co., A. W., Decatur, Ill.
- ● General Fittings Co., Providence, R. I.
- Gerstein & Cooper Co., South Boston, Mass.
- ● Hoffman Specialty Co., Indianapolis, Ind.
- Kainer & Co., Chicago, Ill.
- Kehm Corp., The, Chicago, Ill.
- Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
- Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
- Preferred Utilities Mfg. Corp., New York, N. Y.
- Sarcotherm Controls, Inc., New York, N. Y.
- Sullivan Valve & Engineering Co., Butte, Mont.
- ● Surface Combustion Corp., Toledo, O.
- ● Taco Heaters, Inc., New York, N. Y.
- ● Thrush & Co., H. A. Peru, Ind.
- ● Trane Co., The, La Crosse, Wis.
- Triplex Heating Speciality Co., Inc., Peru, Ind.
- W-H Engineering Co., Chicago, Ill.
- ● Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, VACUUM

- Anderson Products, Inc., Cambridge, Mass.
- Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
- Cashin, W. D. Boston, Mass.
- ● Dunham Co., C. A., Chicago, Ill.
- ● Hoffman Specialty Co., Indianapolis, Ind.
- ● Illinois Engineering Co., Chicago, Ill.
- Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
- Monash-Younker Co., Inc., Chicago, Ill.
- Mouat Vapor Heating Co., The, Cleveland, O.
- ● Sarco Co., Inc., New York, N. Y.
- Sarcotherm Controls, Inc., New York, N. Y.
- ● Sterling, Inc., Milwaukee, Wis.
- Stickle Steam Specialties Co., Indianapolis, Ind.
- ● Trane Co., The, La Crosse, Wis.
- ● Webster & Co., Warren, Camden, N. J.

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SYSTEMS, HEATING, VAPOR

● American District Steam Co., North Tonawanda, N. Y.
Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
Cashin Co., W. D., Boston, Mass.
● Dunham Co., C. A., Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Mouat Vapor Heating Co., The, Cleveland, O.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
● Sterling, Inc., Milwaukee, Wis.
● Trane Co., The, La Crosse, Wis.
Vapor Specialty Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, ZONE CONTROL

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
● Automatic Devices Co., Chicago, Ill.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
● Barber-Colman Co., Rockford, Ill.
Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
● Bell & Gossett Co., Morton Grove, Ill.
● Dunham Co., C. A., Chicago, Ill.
Heat Timer Corp., New York, N. Y.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
Sullivan Valve & Engineering Co., Butte, Mont.
Tallmadge & Co., Webster, East Orange, N. J.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
W-H Engineering Co., Chicago, Ill.
● Webster & Co., Warren, Camden, N. J.
Webster Tallmadge & Co., East Orange, N. J.
Wheelco Instruments Co., Chicago, Ill.

SYSTEMS, PROCESS HEATING, HIGH TEMPERATURE

● Air Devices, Inc., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Dow Chemical Co., The, Midland, Mich.
● Dravo Corp., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Foster Wheeler Corp., New York, N. Y.
Goodyer Industries, Inc., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Lee Engineering Co., Youngstown, O.
Drying Systems, Inc., Chicago, Ill.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Selas Corp. of America, Philadelphia, Pa.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., The, St. Louis, Mo.
● Trane Co., The, La Crosse, Wis.
Trent, Inc., Philadelphia, Pa.
Williams, Inc., F. C., Dearborn, Mich.
● Wing Mfg. Co., L. J., New York, N. Y.

SYSTEMS, ROOF SPRAYING (FOR COOLING ROOFS)

April Showers Co., Washington, D. C.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
● Marley Co., Inc., The, Kansas City, Kan.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Sprinkler Co., Pasadena, Calif.
● Ruppright, Siegfried, Los Angeles, Calif.
Skinner Irrigation Co., Troy, O.
Spray Engineering Co., Somerville, Mass.
● Spraying Systems Co., Chicago, Ill.
Thermal Industries, Indio, Calif.
Water Cooling Corp., New York, N. Y.

SYSTEMS, SPRINKLER, FOR AIR CONDITIONING DUCT SYSTEMS

American Cooling Tower Co., Kansas City, Mo.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Rockwood Sprinkler Co., Worcester, Mass.
Water Cooling Corp., New York, N. Y.

TANK HEADS

See Parts, for Heating and Air Conditioning Equipment

TANKS, EXPANSION, FOR HOT WATER HEATING SYSTEMS

● Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Works Co., E. Akron, O.
Buffalo Tank Corp., Dunellen, N. J.
Caldwell Co., W. E., Louisville, Ky.
Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Certified Furnace Co., Div. of Stainless & Steel Products Co., St. Paul, Minn.
Kehm Corp., The, Chicago, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Maysteel Products, Inc., Milwaukee, Wis.
Rheem Mfg. Co., New York, N. Y.
Scaife Co., Oakmont, Pa.
● Taco Heaters, Inc., New York, N. Y.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
Wheeler Steel Corp., Wheeling, W. Va.

TANKS, PROCESS AND STORAGE

Aeroil Products Co., West New York, N. J.
● Aluminum Co. of America, Pittsburgh, Pa.
American Car & Foundry Co., New York, N. Y.
American Hard Rubber Co., New York, N. Y. (Rubber lined)
Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
● Bell & Gossett Co., Morton Grove, Ill.
Bigelow Co., New Haven, Conn.
Biggs Boiler Wks. Co., E. Akron, O.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
● Brownell Co., Dayton, O.
Buffalo Tank Corp., Dunellen, N. J.
Caldwell Co., W. E., Louisville, Ky.
Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Chicago Bridge & Iron Co., Chicago, Ill.
Chicago Steel Tank Co., Chicago, Ill.
Columbian Steel Tank Co., Kansas City, Mo.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Connery Construction Co., Philadelphia, Pa.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Day Co., The, Minneapolis, Minn.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., Pittsburgh, Pa.
Dillon Steam Boiler Wks., Inc., D. M., Fitchburg, Mass.
Downingtown Iron Works, Downingtown, Pa.
Downs-Smith Brass & Copper Co., New York, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Elastic Porcelain Lining Corp., Rochester, N. Y. (Tank linings)
Falstrom Co., Passaic, N. J.
Farrar & Trefts, Buffalo, N. Y.
● Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Frick Co., Waynesboro, Pa.
Gehri Co., Tacoma, Wash.
General Ceramics Co., Keasbey, N. J.
Gerstein & Cooper Co., South Boston, Mass.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Goodrich Co., B. F., Akron, O. (Rubber lined)
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Hamburg Boiler Wks., Inc., Hamburg, Pa.
Haveg Corp., Newark, Del.
Heat Transfer Products, Inc., Carbondale, Pa.
Hodge Boiler Works, Boston, Mass.
Illinois Oil Products, Inc., Rock Island, Ill.
International Boiler Wks. Co., East Stroudsburg, Pa.
International Engineering Wks., Framingham, Mass.
● Kewanee Boiler Corp., Kewanee, Ill.
Kirk & Blum Mfg. Co., Cincinnati, O.
Knight, Maurice A., Akron, O.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
La Crosse Tractor Co., La Crosse, Wis.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Littleford Bros. Inc., Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Manitowoc Boiler Wks., Manitowoc, Wis.
Maysteel Products, Inc., Milwaukee, Wis.
Murray Iron Wks. Co., Burlington, Ia.
National Lead Co., New York, N. Y.
National Radiator Co., The, Johnstown, Pa.
Newcomb Engineering Co., Grand Rapids, Mich.
Nooter Boiler Works Co., John, St. Louis, Mo.
● Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Quaker City Iron Wks., Philadelphia, Pa.
Rheem Mfg. Co., New York, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Rosebraugh Co., W. W., Salem, Ore.
Scaife Co., Oakmont, Pa.

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Sims Co., Erie, Pa.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Steinhorse & Sons, Inc., Emil, Utica, N. Y.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Struthers Wells Corp., Titusville, Pa.
Tippett & Wood, Phillipsburg, N. J.
Trageser Copper Wks., Inc., Maspeth, Long Island, N. Y.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vesco Corp., New York, N. Y.
Walsh-Holyoke Steam Boiler Co., Holyoke, Mass.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.

TANKS, WASH, FOR CASTINGS

● Bell & Gossett Co., Morton Grove, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Nooter Boiler Works Co., John, St. Louis, Mo.

TAPE, INDUSTRIAL, ADHESIVE

● Bauer & Black, Div. of the Kendall Co., Chicago, Ill.

TEMPERATURE AND HUMIDITY CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

TEMPERATURE RECORDERS

See Recorders, Temperature

TEMPERATURE REGULATORS

See Regulators, Temperature

TEMPLATES, DRAWING, PIPING

Dietzgen Co., Eugene, Chicago, Ill.

TEST CHAMBERS

See Chambers, Test, Controlled Temperature and Humidity

TESTERS, GAGE, DEAD WEIGHT

Ashton Valve Co., Cambridge, Mass.
Dillon Co., Inc., W. C., Chicago, Ill.
Grove Regulator Co., Oakland, Calif.
Mansfield & Green, Cleveland, O.

THERMOMETERS, INDICATING, INDUSTRIAL

American Thermometer Co., St. Louis, Mo.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Dillon Co., Inc., W. C., Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Equipoise Controls, Mount Vernon, N. Y.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
● Gotham Instrument Co., Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon, Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Instrument Associates, Inc., Brooklyn, N. Y.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Co., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrometer Instrument Co., New York, N. Y.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
● Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Co., Chicago, Ill.

THERMOMETERS, INDICATING, REMOTE-READING

Bailey Meter Co., Cleveland, O.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fee & Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
● Gotham Instrument Co., Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hotstream Heater Co., Cleveland, O.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Co., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Chicago, Ill.
Pyrometer Instrument Co., New York, N. Y.
Rochester Mfg. Co., Rochester, N. Y.
● Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.

THERMOMETERS, INDICATING, WALL

American Thermometer Co., St. Louis, Mo.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Fee & Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
● Gotham Instrument Co., Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon, Chicago, Ill.
● Illinois Testing Laboratories, Inc., Chicago, Ill.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corp., Jas. P., Skokie, Ill.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Co., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Pyrometer Instrument Co., New York, N. Y.
Rochester Mfg. Co., Rochester, N. Y.
● Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y. (Effective temperature indicator)

THERMOMETERS, KATA

G. M. Mfg. Co., New York, N. Y.
Palmer Co., Cincinnati (Norwood), O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.

THERMOSTATIC BELLOWS

See Bellows, Thermostatic and Metallic

THERMOSTATIC BI-METALS

See Bi-Metals, Thermostatic

THERMOSTATIC TRAPS

See Traps, Steam, Thermostatic

THERMOSTATS, DUCT TYPE

Armstrong Control Co., Inc., Portland, Ore.
Atlas Valve Co., Inc., Newark, N. J.
● Autempco Corp., New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Newark, N. J.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
● Detroit Lubricator Co., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
● Johnson Service Co., Milwaukee, Wis.
Leslie Co., Lyndhurst, N. J.
Mechanical Industries Production Co., Akron, O.
● Mercoid Corp., The, Chicago, Ill.

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● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, N. Y.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
● Sarco Co., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Stevens Mfg. Co., Inc., Mansfield, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
Taylor Instrument Companies, Rochester, N. Y.
United Electric Controls Co., Boston, Mass.
Vapor Car Heating Co., Inc., Chicago, Ill.
Webster Tallmadge & Co., East Orange, N. J.
● White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, EFFECTIVE TEMPERATURE

● Barber-Colman Co., Rockford, Ill.
Cooper Co., Clark, Palmyra, N. J.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Powers Regulator Co., Chicago, Ill.
Sarcotherm Controls, Inc., New York, N. Y.

THERMOSTATS, IMMERSION

American Instrument Co., Silver Spring, Md.
Armstrong Control Co., Inc., Portland, Ore.
Atlas Valve Co., Inc., Newark, N. J.
● Autempco Corp., New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Newark, N. J.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
● Detroit Lubricator Co., Detroit, Mich.
Douglass Automatic Controls Co., South Gate, Calif.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Fenwal, Inc., Ashland, Mass.
● General Controls Co., Glendale, Calif.
H-B Instrument Co., Philadelphia, Pa.
Hart Mfg. Co., Hartford, Conn.
Industrial Engineering Corp., Terre Haute, Ind.
● Johnson Service Co., Milwaukee, Wis.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Mechanical Industries Production Co., Akron, O.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Struthers Dunn, Inc., Philadelphia, Pa.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
United Electric Controls Co., Boston, Mass.
Vapor Car Heating Co., Inc., Chicago, Ill.
Warren Electric Appliance Co., Warren, Pa.
White Mfg. Co., St. Paul, Minn.
● White-Rodgers Electric Co., St. Louis, Mo. (Hydraulic action)
Wilcolator Co., Elizabeth, N. J.

THERMOSTATS, RADIANT HEAT

● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., Chicago, Ill.
● White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, ROOM OR WALL

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
● Automatic Products Co., Milwaukee, Wis.
● Barber-Colman Co., Rockford, Ill.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cook Electric Co., Diaphlex Div., Chicago, Ill.
Crise Mfg. Co., The, Columbus, O.
Crown Controls Co., Inc., New Bremen, O.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
● Detroit Lubricator Co., Detroit, Mich.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
● Fulton Sylphon Co., Knoxville, Tenn.
● General Controls Co., Glendale, Calif.
Gleason-Avery, Inc., Auburn, N. Y.
● Hoffman Specialty Co., Indianapolis, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
● Johnson Service Co., Milwaukee, Wis.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
McCorkle Co., D. H., Berkeley, Calif.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Chicago, Ill.
Sampsel Time Control, Inc., Spring Valley, Ill.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Co., Attleboro, Mass.
Tallmadge & Co., Webster, East Orange, N. J.
● Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Boston, Mass.
Vapor Car Heating Co., Inc., Chicago, Ill.
Webster Tallmadge & Co., East Orange, N. J.
White Mfg. Co., St. Paul, Minn.
● White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, SURFACE

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
● Detroit Lubricator Co., Detroit, Mich.
Fenwal, Inc., Ashland, Mass.
Hart Mfg. Co., Hartford, Conn.
● Hoffman Specialty Co., Indianapolis, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
McCorkle Co., D. H., Berkeley, Calif.
Mechanical Industries Production Co., Akron, O.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Chicago, Ill.
Red Spot Electric Co., Tacoma, Wash.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Co., Attleboro, Mass.
Stevens Mfg. Co., Inc., Mansfield, O.
Struthers Dunn, Inc., Philadelphia, Pa.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Boston, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
White Mfg. Co., St. Paul, Minn.
● White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, TWO TEMPERATURE OR DUAL

Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
● Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., Newark, N. J.
● Detroit Lubricator Co., Detroit, Mich.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
● General Controls Co., Glendale, Calif.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Gleason-Avery, Inc., Auburn, N. Y.
H-B Instrument Co., Philadelphia, Pa.
● Illinois Engineering Co., Chicago, Ill.
Industrial Engineering Corp., Terre Haute, Ind.
● Johnson Service Co., Milwaukee, Wis.
● Mercoid Corp., The, Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Chicago, Ill.
Ranco, Inc., Columbus, O.
Sampsel Time Control, Inc., Spring Valley, Ill.
● Sarco Co., Inc., New York, N. Y.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
United Electric Controls Co., Boston, Mass.
Vapor Car Heating Co., Inc., Chicago, Ill.
Webster Tallmadge & Co., East Orange, N. J.
● White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, WEATHER COMPENSATING

● Autempco Corp., New York, N. Y.
● Automatic Devices Co., Chicago, Ill.
● Barber-Colman Co., Rockford, Ill.
● Detroit Lubricator Co., Detroit, Mich.
Heat Timer Corp., New York, N. Y.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Chicago, Ill.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
● Thrush & Co., H. A., Peru, Ind.
United Electric Controls Co., Boston, Mass.
● Webster & Co., Warren, Camden, N. J.
Webster Tallmadge & Co., East Orange, N. J.
● White-Rodgers Electric Co., St. Louis, Mo.

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TIME SWITCHES

See Switches, Time

TOGGLE BOLTS

See Bolts, Toggle and Anchor

TONGS, PIPE

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
● Williams & Co., J. H., Buffalo, N. Y.

TOOLS (CHISELS, PLIERS, SCREW DRIVERS, ETC.)

Acme Steel Co., Chicago, Ill. (Strapping tools for holding insulation in place on ducts, pipes, tanks, etc.)
Bernz Co., Inc., Otto, Rochester, N. Y.
Billings & Spencer Co., Hartford, Conn.
● Bonney Forge & Tool Works, Allentown, Pa.
Crescent Tool Co., Jamestown, N. Y.
Everhot Products Co., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
International Nutyp Tool Co., Oswego, N. Y.
Interstate Sales Co., New York, N. Y. (Protractor for layout work)
Mid-States Equipment Co., Chicago, Ill. (Saw gun)
Millers Falls Co., Greenfield, Mass.
Misener Mfg. Co., Inc., Syracuse, N. Y. (Rotary hole saws)
Morey, Dan, Los Angeles, Calif.
Parker-Kalon Corp., New York, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Persson Co., T. G., Bloomfield, N. J. (flange jacks)
Rawlplug Co., Inc., The, New York, N. Y. (drills for masonry)
Richmont, Inc., Los Angeles, Calif.
Rotary Concrete Drill Co., Pasadena, Calif. (Drill bits)
Schild Mfg. Co., Milwaukee, Wis.
Snap-On Tools Corp., Kenosha, Wis.
Tempo Products Co., Cleveland, O. (Tool employing power of exploding powder charge to drive studs into steel, concrete, masonry)
Thompson & Son Co., The Henry G., New Haven, Conn.
Walton Co., Hartford, Conn. (Tap extractors)
● Williams & Co., J. H., Buffalo, N. Y. (Flange separators for gasket replacement)

TOOLS, FLARING, FOR TUBING

● Bonney Forge & Tool Works, Allentown, Pa.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Dudgeon, Inc., Richard, New York, N. Y.
Everhot Products Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Leonard Precision Products Co., Garden Grove, Calif.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
Sac Tool Mfg. Co., St. Louis, Mo.
Weatherhead Co., Cleveland, O.

TORCHES, BRAZING AND SOLDERING

Aeroil Products Co., West New York, N. J.
Air Reduction Sales Co., New York, N. Y.
Atkins & Co., E. C., Indianapolis, Ind.
Bernz Co., Inc., Otto, Rochester, N. Y.
Black Mfg. Co., The, Baltimore, Md.
Borm Mfg. Co., Elgin, Ill.
Century Aircraft Co., Inglewood, Calif.
● Clayton & Lambert Mfg. Co., Louisville, Ky.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Ergolyte Mfg. Co., Philadelphia, Pa.
General Scientific Equipment Co., Philadelphia, Pa.
Harris Calorific Co., The, Cleveland, O.
Ideal Industries, Inc., Sycamore, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Insto-Gas Corp., Detroit, Mich.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Lee Co., K. O., Aberdeen, S. D.
Lenk Mfg. Co., Boston, Mass.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Mid-States Equipment Co., Chicago, Ill.
Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
National Pumpless Blowtorch Co., Cleveland, O.
Powder Weld Process Co., The, Brooklyn, N. Y.
Reiner & Campbell Co., Inc., Elizabeth, N. J.
Sac Tool Mfg. Co., St. Louis, Mo.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torit Mfg. Co., St. Paul, Minn.
Trindl Products, Ltd., Chicago, Ill.
Turner Brass Works, The, Sycamore, Ill.
Victor Equipment Co., San Francisco, Calif.
Wall Chemicals Div. of The Liquid Carbonic Corp., Chicago, Ill.
Welding Apparatus Co., Chicago, Ill.
Will-Weld Mfg. Co., Inc., Omaha, Neb.

TORQUE INDICATING WRENCHES

See Wrenches, Torque Indicating

TOWERS, COOLING, ATMOSPHERIC

American Cooling Tower Co., Kansas City, Mo.
Binks Mfg. Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Foster Wheeler Corp., New York, N. Y.
Harry Cooling Towers, Inc., New York, N. Y.
Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
● Marley Co., Inc., Kansas City, Kan.
National Engineering & Mfg. Co., Kansas City, Mo.
● New England Cooling Tower Co., Boston, Mass.
Pennsylvania Engineering Wks., New Castle, Pa.
Phillips Cooling Tower Co., Inc., New York, N. Y.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
● Spraying Systems Co., Chicago, Ill.
Stewart Ice Machine Co., Pomona, Calif.
Thermal Industries, Indio, Calif.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Corp., St. Louis, Mo.
Water Cooling Tower Co., Chicago, Ill.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
● Young Radiator Co., Racine, Wis. (radiator type)

TOWERS, COOLING, MECHANICAL DRAFT

American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
Binks Mfg. Co., Chicago, Ill.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Foster Wheeler Corp., New York, N. Y.
Harry Cooling Towers, Inc., New York, N. Y.
Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
● Marley Co., Inc., Kansas City, Kan.
● Marlo Coil Co., St. Louis, Mo.
● Murray Mfg. Co., D. J., Wausau, Wis.
National Engineering & Mfg. Co., Kansas City, Mo.
● New England Cooling Tower Co., Boston, Mass.
Pennsylvania Engineering Wks., New Castle, Pa.
Phillips Cooling Tower Co., Inc., New York, N. Y.
● Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Rogers Air Conditioning Div., New York, N. Y.
Thermal Industries, Indio, Calif.
● Trane Co., The, LaCrosse, Wis.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Corp., St. Louis, Mo.
Water Cooling Tower Co., Chicago, Ill.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.

TRANSFORMERS, ELECTRIC

Arjac Products Inc., Rochester, N. Y.
Armstrong Control Co., Inc., Portland, Ore.
Bogue Electric Co., Paterson, N. J.
Brown Electric Co., Forest Hills, N. Y.
Canatsey Electric Mfg. Co., Kansas City, Mo.
Crown Controls Co., Inc., New Bremen, O.
Davis & Co., Inc., Dean W., Kentland, Ind.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hampton Electric Mfg. Co., Pittsburgh, Pa.
Jefferson Electric Co., Bellwood, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Rex Welder & Engineering Co., Kansas City, Mo.
Sola Electric Co., Chicago, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
● Wagner Electric Corp., St. Louis, Mo.
Webster Electric Co., Racine, Wis.
West Coast Electrical Mfg. Co., Los Angeles, Calif.

TRANSMISSION DRIVES

See Drives, Chain, Flat Belt and V-Belt

TRAPS, STEAM, MECHANICAL

● American District Steam Co., North Tonawanda, N. Y.
● Anderson Co., V. D., The, Cleveland, O.
● Armstrong Machine Wks., Three Rivers, Mich.
Bailey Co., Chas. M., San Francisco, Calif.
Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Boylston Steam Specialty Co., Chicago, Ill.
Bundy Steam Trap Co., Nashua, N. H.
Burrows Mfg. Co., F. A., York, Pa.

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Cashin Co., W. D., Boston, Mass.
Clark Mfg. Co., Cleveland, O.
Coe Mfg. Co., Painesville, O.
● Crane Co., Painesville, O.
● Crane Co., Chicago, Ill.
Cryer Trap & Valve Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Davis Regulator Co., Chicago, Ill.
● Dunham Co., C. A., Chicago, Ill.
Ellis Drier Co., C. A., Chicago, Ill.
● Fisher Governor Co., Marshalltown, Ia.
● Haines & Co., William S., Philadelphia, Pa. (Combination float & thermostatic)
Healy Ruff Co., St. Paul, Minn.
● Hoffman Specialty Co., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
● Illinois Engineering Co., Chicago, Ill.
● Johnson Corp., The, Three Rivers, Mich.
Justus Steam Trap Co., Napanoch, N. Y.
Kayne & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Chicago, Ill.
Leavitt Machine Co., Orange, Mass.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
McAuley Trap Co., Pittsburgh, Pa.
Milwaukee Valve Co., Milwaukee, Wis.
Monash-Younker Co., Inc., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
Mouat Vapor Heating Co., The, Cleveland, O.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nason Co., Detroit, Mich.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
● Sarco Co., Inc., New York, N. Y.
● Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Squires Co., C. E., Cleveland, O.
● Sterling, Inc., Milwaukee, Wis.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Swendeman, Inc., Boston, Mass.
Templeton Bros., Hyde Park, Mass. (Return)
Templeton Mfg. Co., Hyde Park, Mass.
● Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Specialty Co., New York, N. Y.
Watson & McDaniel Co., Philadelphia, Pa.
● Webster & Co., Warren, Camden, N. J.
Williams Gauge Co., The, Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich. (Combination)
● Yarnall-Waring Co., Philadelphia, Pa.

TRAPS, STEAM, THERMOSTATIC

● American District Steam Co., North Tonawanda, N. Y.
Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., Detroit, Mich.
Cashin Co., W. D., Boston, Mass.
Cryer Trap & Valve Co., Inc., New York, N. Y.
● Dunham Co., C. A., Chicago, Ill.
● Haines & Co., William S., Philadelphia, Pa.
● Hoffman Specialty Co., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
● Illinois Engineering Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Monash-Younker Co., Inc., Chicago, Ill.
Mouat Vapor Heating Co., The, Cleveland, O.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Powers Regulator Co., Chicago, Ill.
● Sarco Co., Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
● Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Swartwout Co., Cleveland, O.
● Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Car Heating Co., Inc., Chicago, Ill.
Vapor Specialty Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.

TREATMENT, STEAM SYSTEM, TO INHIBIT CORROSION

American Water Softener Co., Philadelphia, Pa.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Apex All Weather Products, Chicago, Ill.
● Apex Engineering Co., Chicago, Ill.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Calgon, Inc., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Everett, Mass.
Carbide & Carbon Chemicals Corp., New York, N. Y.
Elgin Softener Corp., Elgin, Ill.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Haering & Co., Inc., D. W., Chicago, Ill.
Liquid Conditioning Corp., Linden, N. J.
McRay Sales Co., Pasadena, Calif.
National Aluminate Corp., Chicago, Ill.
%Proportioneers, Inc. %, Providence, R. I.
Rid-Sludge Div., Aulwood Mfg. Co., St. Paul, Minn. (vapor treatment to remove sludge from heating system)
Saverite Engineering Co., Hoboken, N. J.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Vinco Co., Inc., The, New York, N. Y.
Water Treatment Co. of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
Whiting Stoker Sales Co., Chicago, Ill.
X Laboratories, Inc., New York, N. Y.

TREATMENT, WATER, TO INHIBIT CORROSION

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Cyanamid & Chemical Corp., New York, N. Y.
American K. A. T. Corp., New York, N. Y.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Bogue Electric Co., Paterson, N. J.
Calgon, Inc., Pittsburgh, Pa.
Cannon Chemical Co., Everett, Mass.
Cochrane Corp., Philadelphia, Pa.
Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Dowell Inc., Tulsa, Okla.
Elgin Softener Corp., Elgin, Ill.
Ferro-Nil Corp., New York, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
General Ozone Corp., Chicago, Ill.
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Grief, Edward C., Bogota, N. J.
Haering & Co., D. W., Chicago, Ill.
● Hagan Corp., Pittsburgh, Pa.
Liquid Conditioning Corp., Linden, N. J.
Maintenance Engineering Corp., Houston, Tex.
McRay Sales Co., Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Monsanto Chemical Co., Organic Chemicals Div., St. Louis, Mo.
Mutual Chemical Co. of America, New York, N. Y.
National Aluminate Corp., Chicago, Ill.
North American Fibre Products Co., The, Cleveland, O.
Norwood Filtration Co., The, Florence, Mass.
Oakite Products, Inc., New York, N. Y.
O'Brien Industries, Jersey City, N. J.
% Proportioneers, Inc., %, Providence, R. I.
Permutit Co., New York, N. Y.
Perolin Co., Inc., Chicago, Ill.
Refinite Corp., Omaha, Nebr.
Research Products Corp., Madison, Wis.
Ridgefield Chemical Products Co., Inc., Ridgefield, N. J.
Rodwell Engineering & Sales Co., Omaha, Neb.
Saverite Engineering Co., Hoboken, N. J.
Solvay Sales Corp., New York, N. Y.
Sudbury Laboratory, South Sudbury, Mass.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Uniflow Mfg. Co., Erie, Pa.
Vinco Co., Inc., The, New York, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.
Water Refining Co., Ft. Wayne, Ind.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Company of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
Whiting Stoker Sales Co., Chicago, Ill.
● Worthington Pump & Machinery Corp., Harrison, N. J.
X Laboratories, Inc., New York, N. Y.

TREATMENT, WATER, FOR SLIME AND ALGAE CONTROL

American Well Works, Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatic Chemical Laboratories, Inc., New York, N. Y.
Carolina Aniline & Extract Co., Inc., Charlotte, N. C.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Dowell Inc., Tulsa, Okla.
Haering & Co., Inc., D. W., Chicago, Ill.
Liquid Conditioning Corp., Linden, N. J.
McRay Sales Co., Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Aluminate Corp., Chicago, Ill.
Oakite Products, Inc., New York, N. Y.
% Proportioneers, Inc., %, Providence, R. I.
Refinite Corp., Omaha, Nebr.
Wallace & Tiernan Co., Inc., Newark, N. J.
Western Chemical Co., Kansas City, Mo.

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TRY-COCKS, BOILER

Bailey Co., Chas. M., San Francisco, Calif.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Diamond Power Specialty Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Keckley Co., O. C., Chicago, Ill.
● Lunkenheimer Co., Cincinnati, O.
Reliance Gauge Column Co., Cleveland, O.

TUBE CLEANERS

See Cleaners, Tube

TUBES, BOILER

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp., Sub., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Standard Tube Co., Highland Park, Mich.
Timken Roller Bearing Co., Canton, O.

TUBES, CONDENSER

● American Brass Co., Waterbury, Conn.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
Bundy Tubing Co., Detroit, Mich.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Detroit Seamless Steel Tubes Co., Detroit, Mich.
● Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
● Revere Copper and Brass Incorporated, New York, N. Y.
Standard Tube Co., Highland Park, Mich.
Timken Roller Bearing Co., Canton, O.
● Wolverine Tube Div. of Calumet & Hecla Consolidated Copper Co., Detroit, Mich.
● York Corp., York, Pa.

TUBES, PITOT

Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Hill, E. Vernon, Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.

TUBING, ALUMINUM

● Aluminum Co. of America, Pittsburgh, Pa.
B & M Mfg. Co., East Orange, N. J.
● Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
● Revere Copper and Brass Incorporated, New York, N. Y.

TUBING BENDERS

See Benders, Tubing

TUBING, BRASS AND COPPER

● American Brass Co., Waterbury, Conn.
B & M Mfg. Co., East Orange, N. J.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Everhot Products Co., Chicago, Ill.
Hussey & Co., C. G., Pittsburgh, Pa.
Keeney Mfg. Co., Newington, Conn. (Chrome plated)
● Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
Phelps Dodge Copper Products Corp., British American Tube Div., New York, N. Y.
Reading Tube Corp., New York, N. Y.
● Revere Copper and Brass Incorporated, New York, N. Y.
Roberts Tube Works, Detroit, Mich.
● Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich.

TUBING, BRONZE

● American Brass Co., Waterbury, Conn.
B & M Mfg. Co., East Orange, N. J.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
● Revere Copper and Brass, Incorporated, New York, N. Y.

TUBING CUTTERS

See Cutters, Tubing

TUBING, DUPLEX

Bridgeport Brass Co., Bridgeport, Conn.
Pacific Tube Co., Los Angeles, Calif. (Non-ferrous to ferrous)
Republic Steel Corp., Steel & Tubes Div., Cleveland, O. (Steel and copper)

TUBING, FINNED

Aerofin Corp., Syracuse, N. Y.
American Coils Co., Newark, N. J.
Brown Fintube Co., The, Elyria, O.
● Bush Mfg. Co., Hartford, Conn.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
● Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.
Fintube Coil Corp., Alhambra, Calif.
G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
● McCord Corp., Detroit, Mich.
Merchant & Evans Co., Philadelphia, Pa.
Minimite Co., Chicago, Ill.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Tenney Engineering, Inc., Newark, N. J.
Vapor Car Heating Co., Inc., Chicago, Ill.
● Wolverine Tube Div. of Calumet and Hecla Consolidated Copper Co., Detroit, Mich. (Aluminum, copper)

TUBING, MAGNESIUM

B & M Mfg. Co., East Orange, N. J.
Dow Chemical Co., The, Midland, Mich.
● Revere Copper and Brass Incorporated, New York, N. Y.

TUBING, NICKEL AND NICKEL ALLOY

Agaloy Tubing Co., Springfield, O.
B & M Mfg. Co., East Orange, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
Bundy Tubing Co., Detroit, Mich.
Chase Brass & Copper Co., Waterbury, Conn.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
● Globe Steel Tubes Co., Milwaukee, Wis.
International Nickel Co., New York, N. Y.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
● Revere Copper and Brass Incorporated, New York, N. Y.
Trent Tube Mfg. Co., East Troy, Wis.

TUBING, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
American Hard Rubber Co., New York, N. Y.
Commercial Plastics Co., Chicago, Ill.
Extruded Plastics, Inc., Norwalk, Conn.
General Electric Co., Chemical Dept., Pittsfield, Mass.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Irvington Varnish and Insulator Co., Irvington, N. J.
Mills Corp., Elmer E., Chicago, Ill.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Parker Appliance Co., The, Cleveland, O.
Resistoflex Corp., Belleville, N. J.
Sandee Mfg. Co., Chicago, Ill.
United States Stoneware Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

TUBING, SILVER CLAD AND SILVER ALLOY

General Plate Div., Metals & Controls Corp., Attleboro, Mass.

TUBING, STEEL, ALLOY, SEAMLESS

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Detroit Seamless Steel Tubes Co., Detroit, Mich.
● Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., United States Steel Corp. Subsidiary, Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Canton, O.
● Youngstown Sheet & Tube Co., Youngstown, O.

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TUBING, STEEL, ALLOY, WELDED

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Duraloy Co., Scottdale, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Pacific Tube Co., Los Angeles, Calif.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
● Revere Copper and Brass Incorporated, New York, N. Y.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Standard Tube Co., Highland Park, Mich.
Trent Tube Mfg. Co., East Troy, Wis.
● Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, SEAMLESS

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Detroit Seamless Steel Tubes Co., Detroit, Mich.
● Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Steel Co., Pittsburgh, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Canton, O.
● Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
B & M Mfg. Co., East Orange, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
● Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Standard Tube Co., Highland Park, Mich.
Timken Roller Bearing Co., Canton, O.
Trent Tube Mfg. Co., East Troy, Wis.

TUBING, STEEL, WELDED

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bundy Tubing Co., Detroit, Mich.
Everhot Products Co., Chicago, Ill.
● Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Tube Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
● Revere Copper and Brass Incorporated, New York, N. Y.
South Chester Tube Co., Chester, Pa.
● Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Standard Tube Co., Highland Park, Mich.
● Wheatland Tube Co., Philadelphia, Pa.
● Youngstown Sheet & Tube Co., Youngstown, O.

TURBINES, MECHANICAL DRIVE

● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Carling Blower Co., Worcester, Mass.
Coppus Engineering Corp., Worcester, Mass.
Dean Hill Pump Co., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Elliott Co., Jeannette, Pa.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Murray Iron Wks. Co., Burlington, Ia.
● Pyle-National Co., The, Chicago, Ill.
Steam Turbine Div., Worthington Pump and Machine Corp., Wellesville, N. Y.
Terry Steam Turbine Co., Hartford, Conn.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Wing Mfg. Co., L. J., New York, N. Y.

2, 3 AND 4-WAY VALVES

See Valves, 2, 3 and 4-way

UNDERGROUND PIPING

See Conduit, Underground Piping

UNDERWATER HEATERS

See Heaters, Steam Jet, for Liquids

UNIONS, BRASS

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
● Crane Co., Chicago, Ill.
● Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
● General Fittings Co., Providence, R. I.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Kennedy Valve Mfg. Co., The, Elmira, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
● Lunkenheimer Co., Cincinnati, O.
Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., The, Cleveland, O.
Phoenix Brass Fittings Corp., Irvington, N. J.
Powell Co., Wm., Cincinnati, O.
Rhode Island Fittings Co., Hillsgrove, R. I.
Schaible Co., The, Cincinnati, O.
Union Metal Works, Chelsea, Mass.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburg, Pa.

UNIONS, MALLEABLE, BRASS SEAT

Corley Co., Inc., The, Jersey City, N. J.
● Crane Co., Chicago, Ill.
Dart Mfg. Co., E. M., Providence, R. I.
Detroit Brass & Malleable Wks., Detroit, Mich.
Fairbanks Co., New York, N. Y.
● Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Flori Pipe Co., The, St. Louis, Mo.
● General Fittings Co., Providence, R. I.
Grabler Mfg. Co., Cleveland, O.
● Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Jefferson Union Co., Inc., New York, N. Y.
● Kennedy Valve Mfg. Co., The, Elmira, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
Malleable Iron Fittings Co., Branford, Conn.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Rhode Island Fittings Co., Hillsgrove, R. I.
Rockwood Sprinkler Co., Worcester, Mass.
Star Mfg. Co., Inc., Providence, R. I.
Stockham Pipe Fittings Co., Birmingham, Ala.
● Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburg, Pa.

UNIONS, ORIFICE

Catawissa Valve & Fittings Co., Catawissa, Pa.
Conoflow Corp., Philadelphia, Pa.
Hamer Oil Tool Co., Long Beach, Calif.
● Watson-Stillman Co., Roselle, N. J.

UNIONS, STEEL

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
Catawissa Valve & Fittings Co., Catawissa, Pa.
Champion Machine & Forging Co., Cleveland, O.
● Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
● Frick Co., Waynesboro, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
● Henry Valve Co., Chicago, Ill.
Rockwood Sprinkler Co., Worcester, Mass.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.

UNIT COOLERS

See Coolers, Unit

UNIT HEATERS

See Heaters, Unit

UNIT VENTILATORS

See Ventilators, Unit

UNITS, AIR CONDITIONING, CENTRAL STATION TYPE

Self contained blower, heating and/or cooling coil, filter, humidifier unit for remote location and duct air distribution

● Air & Refrigeration Corp., New York, N. Y.
Airtemp, Div. of Chrysler Corp., Dayton, O.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Alton Mfg. Co., Dallas, Tex.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
American Cooling Tower Co., Kansas City, Mo.
American Thermal Industries, Detroit, Mich.
Anetsberger Bros., Chicago, Ill.
Bahnson Co., Winston-Salem, N. C.

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Baker Ice Machine Co., Inc., South Windham, Me.
Beacon-Morris Corp., Boston, Mass. (Custom built)
Blazer, M., & Son, Passaic, N. J.
● Bryant Heater Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Eckhart Mfg. Co., Roselle Park, N. J.
● Fedders-Quigan Corp., Buffalo, N. Y.
Forman Air Conditioning & Engrg. Co., New York, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Engineering & Mfg. Co., St. Louis, Mo.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
● Hastings Air Conditioning Co., Hastings, Neb.
Howe Ice Machine Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Manufacturers Fin Coil Co., Chicago, Ill.
● Marlo Coil Co., St. Louis, Mo.
Mayflower Air-Conditioners, Inc., St. Paul, Minn.
Mayflower Products, Inc., Richmond, Ind.
● McQuay, Inc., Minneapolis, Minn.
Micheli Air Conditioning Co., Inc., Schenectady, N. Y.
Niagara Blower Co., New York, N. Y.
Palmer Mfg. Corp., Phoenix, Ariz.
Parks-Cramer Co., Fitchburg, Mass.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., St. Louis, Mo.
● Surface Combustion Corp., Toledo, O.
● Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
● United States Radiator Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigeration Co., Chicago, Ill.
● York Corp., York, Pa.

UNITS, AIR CONDITIONING, HORIZONTAL PACKAGE TYPE

Self contained blower, cooling and/or heating coil, filter, humidifier unit for ceiling or platform location in space conditioned, for connection to remote compressor or cold water supply, and steam or hot water

● Air & Refrigeration Corp., New York, N. Y.
Airtemp Div. of Chrysler Corp., Dayton, O.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
American Thermal Industries, Detroit, Mich.
Baker Ice Machine Co., Inc., South Windham, Me.
Beacon-Morris Corp., Boston, Mass. (Custom built)
Blazer, M., & Son, Passaic, N. J.
● Bryant Heater Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Conditionaire Unit Co., Chicago, Ill.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Doyle & Roth Mfg. Co., Long Island City, N. Y.
Drayer & Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
● Fedders-Quigan Corp., Buffalo, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
● Hastings Air Conditioning Co., Hastings, Neb.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Manufacturers Fin Coil Co., Chicago, Ill.
● Marlo Coil Co., St. Louis, Mo.
Mayflower Air-Conditioners, Inc., St. Paul, Minn.
Mayflower Products, Inc., Richmond, Ind.
● McQuay, Inc., Minneapolis, Minn.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
Rogers Air Conditioning Div., New York, N. Y.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Stainless & Steel Products Co., St. Paul, Minn.
Tenney Engineering, Inc., Newark, N. J.
● Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, INDUSTRIAL TYPE

● Air & Refrigeration Corp., New York, N. Y.
American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Thermal Industries, Detroit, Mich.
Anetsberger Bros., Chicago, Ill.
Bahnson Co., Winston-Salem, N. C.
Baker Ice Machine Co., Inc., South Windham, Me.
Beacon-Morris Corp., Boston, Mass. (Custom built)
Blazer, M., & Son, Passaic, N. J.
● Bryant Heater Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
● Curtis Refrigeration Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer & Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Economy Equipment Co., Inc., Chicago, Ill.
● Fedders-Quigan Corp., Buffalo, N. Y.
● Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Engineering & Mfg. Co., St. Louis, Mo.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Lintern Co., Berea, O.
Manufacturers Fin Coil Co., Chicago, Ill.
● Marlo Coil Co., St. Louis Mo.
Mayflower Products, Inc., Richmond, Ind.
● McQuay, Inc., Minneapolis, Minn.
New York Blower Co., Chicago, Ill. (Make-up air units)
Niagara Blower Co., New York, N. Y.
Norwood Filtration Co., The, Florence, Mass.
Parks-Cramer Co., Fitchburg, Mass.
Peerless of America, Inc., Chicago, Ill.
Pfening Co., Fred D., Columbus, O.
Production Planning Co., Rochester, Mich. (Make-up air units)
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
● Rempe Co., Chicago, Ill.
Rogers Air Conditioning Div., New York, N. Y.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Somers, Inc., H. J., Detroit, Mich.
Surface Combustion Corp., Toledo, O.
Tenney Engineering, Inc., Newark, N. J. (Including test chambers)
● Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, REVERSE REFRIGERATION CYCLE

Drayer & Hanson, Inc., Los Angeles, Calif.
General Engineering & Mfg. Co., St. Louis, Mo.
Muncie Gear Works, Inc., Muncie, Ind.
Terra-Temp Co., Inc., Indianapolis, Ind.

UNITS, AIR CONDITIONING, SUMMER, EVAPORATIVE COOLING TYPE

For cooling by evaporation, no dehumidification

Air Equipment Co., Denver, Colo.
● Air & Refrigeration Corp., New York, N. Y.
Alton Mfg. Co., Dallas, Tex.

● Advertisement in this issue. See Index to Advertisers, page 416

American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Metal Products Co., Fort Worth, Tex.
American Moistening Co., Providence, R. I.
Annis Air Filters, Glendale, Calif.
April Showers Co., Washington, D. C.
Aqua-Mist Co., Topeka, Kans.
Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
Bahnson Co., Winston-Salem, N. C.
Bien Air Conditioning Co., Monterey Park, Calif.
Campbell Heating Co., E. K., Kansas City, Mo.
● Carrier Corp., Syracuse, N. Y.
Climax Machinery Co., Indianapolis, Ind.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Drying Systems, Inc., Chicago, Ill.
Essick Mfg. Co., Los Angeles, Calif.
Farr Co., Los Angeles, Calif.
General Engineering & Mfg. Co., St. Louis, Mo.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Great National Air Conditioning Co., Dallas, Tex.
International Sales Co., San Francisco, Calif.
Martin Fan & Blower Co., Chicago, Ill.
Montag Stove & Furnace Works, Portland, Ore.
Morey, Dan, Los Angeles, Calif. (mats for evaporative coolers)
Mountain States Equipment Co., Denver, Colo.
National Engineering & Mfg. Co., Kansas City, Mo.
Niagara Blower Co., New York, N. Y.
Palmer Mfg. Co., Phoenix, Ariz.
Peerless of America, Inc., Chicago, Ill.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Rheem Mfg. Co., New York, N. Y.
Rhode Island Humidifier & Ventilating Co., Boston, Mass.
Royal Heaters Inc., Alhambra, Calif.
Steamaire Co., Cincinnati, O.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Pittsburgh, Pa.
X L Refrigerating Co., Chicago, Ill.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, REMOTE COMPRESSOR OR COLD WATER, UNDER 3 TONS CAPACITY

Self contained blower, coil, filter unit for connection to remote compressor or cold water supply

Airtemp, Div. of Chrysler Corp., Dayton, O.
American Coils Co., Newark, N. J.
● Carrier Corp., Syracuse, N. Y.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Giant Mfg. Co., Council Bluffs, Ia.
● Hastings Air Conditioning Co., Hastings, Neb.
● Ilg Electric Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
● Kennard Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Mayflower Products, Inc., Richmond, Ind.
● Nat Corp., Kansas City, Mo.
Norwin Co., Freeport, Ill.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton O.
Scott-Newcomb, Inc., St. Louis, Mo.
● Trane Co., The, La Crosse, Wis.
Unified Air Conditioner Co., Duluth, Minn.
● United States Air Conditioning Corp., Minneapolis, Minn.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigeration Co., Chicago, Ill.
● York Corp., York, Pa.
● Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, UNDER 3 HP

Self contained blower, coil, compressor, filter unit

Airtemp, Div. of Chrysler Corp., Dayton, O.
American Coils Co., Newark, N. J.
● Carrier Corp., Syracuse, N. Y.
Controldtemp Equipment Sales Corp., Brooklyn, N. Y.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Ice Cooling Appliance Corp., Morrison, Ill. (Ice)
● Ilg Electric Ventilating Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Mayflower Products, Inc., Richmond, Ind.
● McQuay, Inc., Minneapolis, Minn.
● Nat Corp., Kansas City, Mo.
Pacific Mfg. Corp., Cleveland, O.
Peerless of America, Inc., Chicago, Ill.
Philco Corp., Philadelphia, Pa.
Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
Rogers Air Conditioning Div., New York, N. Y.
Scott-Newcomb, Inc., St. Louis, Mo.
● Trane Co., The, LaCrosse, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
● York Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, STORE TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, 3 HP AND OVER

Self contained blower, coil, compressor, filter unit with air discharge approximately 6 ft. above floor

Airtemp, Div. of Chrysler Corp., Dayton, O.
American Thermal Industries, Detroit, Mich.
Baker Ice Machine Co., Inc., South Windham, Me.
● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Controldtemp Equipment Sales Corp., Brooklyn, N. Y.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Forman Air Conditioning & Engrg. Co., New York, N. Y.
● Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Engineering & Mfg. Co., St. Louis, Mo.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Mayflower Products, Inc., Richmond, Ind.
● Nat Corp., Kansas City, Mo.
● Nevinger Mfg. Co., Inc., Greenville, Ill.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
Scott-Newcomb, Inc., St. Louis, Mo.
● Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
● United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Pittsburgh, Pa.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

UNITS, AIR CONDITIONING, WINTER, ROOM TYPE, FLOOR CABINET

Self contained blower, filter, heating coil, humidifier unit

● Air & Refrigeration Corp., New York, N. Y.
Aladdin Heating Corp., Oakland, Calif.
American Blower Corp., Detroit, Mich.
Auburn Burner Co., Auburn, Ind.
● Bryant Heater Co., Cleveland, O.
● Buffalo Forge Co., Buffalo, N. Y.
● Campbell Heating Co., Des Moines, Ia.
● Carrier Corp., Syracuse, N. Y.
Circulators & Devices Mfg. Corp., New York, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
Dalzen Tool & Mfg. Co., Detroit, Mich.
● Ilg Electric Ventilating Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kehm Corp., The, Chicago, Ill.
● Kennard Corp., St. Louis, Mo.
● McQuay, Inc., Minneapolis, Minn.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Reznor Mfg. Co., Mercer, Pa.
Richmond Radiator Co., New York, N. Y.
Somers, Inc., H. J., Detroit, Mich.
● Surface Combustion Corp., Toledo, O.
● Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Unified Air Conditioner Co., Duluth, Minn.
● United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
Westinghouse Electric Corp., Pittsburgh, Pa.
● York Corp., York, Pa.

UNITS, AIR CONDITIONING, YEAR AROUND, ROOM TYPE, FLOOR CABINET

Self contained blower, cooling and heating coil, filter, humidifier unit for connection to remote compressor or cold water supply, and steam or hot water supply

● Air & Refrigeration Corp., New York, N. Y.
Airtemp, Div. of Chrysler Corp., Dayton, O.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Beacon-Morris Corp., Boston, Mass. (Custom built)
● Buffalo Forge Co., Buffalo, N. Y.

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● Carrier Corp., Syracuse, N. Y.
● Clarage Fan Co., Kalamazoo, Mich.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
● General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
General Engineering & Mfg. Co., St. Louis, Mo.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
● **Hastings Air Conditioning Co., Hastings, Neb.**
● Ilg Electric Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Johnson Co., S. T., Philadelphia, Pa.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Div., Nash-Kelvinator Corp., Detroit, Mich.
● Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
● Marlo Coil Co., St. Louis, Mo.
● McQuay, Inc., Minneapolis, Minn.
● Nat Corp., Kansas City, Mo.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago Ill.
Pleasantaire Corp., Washington, D. C.
Refrigeration Economics Co., Inc., Canton, O.
Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
● Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Unified Air Conditioner Co., Duluth, Minn.
Westinghouse Electric Corp., Pittsburgh, Pa.
● York Corp., York, Pa.

UNITS, COOLING, WINDOW TYPE

Climax Machinery Co., Indianapolis, Ind.
Frigidaire Div., General Motors Corp., Dayton, O.
General Engineering & Mfg. Co., St. Louis, Mo.
Mitchell Mfg. Co., Chicago, Ill.
Pacific Mfg. Corp., Cleveland, O.
Pleasantaire Corp., Washington, D. C.
● United States Air Conditioning Corp., Minneapolis, Minn.

UNITS, FUEL OIL, HEATING, PUMPING AND STRAINING

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Graham Mfg. Co., Inc., New York, N. Y.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Sundstrand Machine Tool Co., Hydraulic Div., Rockford, Ill.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.

UNITS, STERILIZING, AIR

Hanovia Chemical & Mfg. Co., Newark, N. J.

UNITS, WINDOW VENTILATOR AND FILTER

Airgard Mfg. Co., Chicago, Ill.
American Air Conditioning Co., Detroit, Mich.
● Carrier Corp., Syracuse, N. Y.
Circulators & Devices Mfg. Corp., New York, N. Y.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
● Ilg Electric Ventilating Co., Chicago, Ill.
Johnson Fan & Blower Corp., Chicago, Ill.
Kaiser Co., H. S., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Mellish & Murray Co., Chicago, Ill.
Pacific Mfg. Corp., Cleveland, O.
Reed Unit-Fans, Inc., New Orleans, La.
Reliable Sheet Metal Engineering Co., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Somers Inc., H. J., Detroit, Mich.
Unified Air Conditioner Co., Duluth, Minn.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.

UNIVERSAL JOINTS

See Joints, Universal, for Operating Valves

VACUUM CLEANERS FOR BOILERS

See Cleaners, Vacuum, for Boilers

VACUUM GAGES

See Gages, Indicating, Vacuum

VACUUM HEATING SYSTEMS

See Systems, Heating, Vacuum

VACUUM PUMPS

See Pumps, Vacuum

VACUUM RECORDERS

See Recorders, Pressure and Vacuum

VALVE OPERATORS

See Operators, Valve

VALVE RESEATERS

See Reseaters, Valve

VALVES, AIR OPERATING

Bailey Co., Chas. M., San Francisco, Calif.
Bristol Co., The, Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Clark Controller Co., Cleveland, O.
Clayton Mfg. Co., El Monte, Calif.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Darling Valve & Mfg. Co., Williamsport, Pa.
● Gotham Instrument Co., Inc., New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hunt & Son, Inc., H. B., Salem, O.
● Illinois Engineering Co., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Leslie Co., Lyndhurst, N. J.
Schade Valve Mfg. Co., Philadelphia, Pa.
Wilson Engineering Corp., Chicago, Ill.

VALVES, ANGLE

Albright Equipment Co., Johnstown, Pa.
Alloy Steel Products Co., Linden, N. J.; (Stainless steel)
● American Brass Co., Waterbury, Conn.
Automatic Temperature Co., Inc., Philadelphia, Pa.
Belfield Co., H., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Bordo Co., Inc., L. J., Glenside, Pa. (Plug)
Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., Detroit, Mich.
Central Brass Mfg. Co., Cleveland, O.
Chapman Valve Mfg. Co., The Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Clayton Mfg. Co., El Monte, Calif.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Cooper Alloy Foundry Co., Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Edward Valves, Inc., East Chicago, Ind.
Fairbanks Co., New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
● Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Henry Valve Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
● Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Klingerit, Inc., New York, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard Rubber)
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
O'Malley Valve Co., Edward, Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
● Sterling, Inc., Milwaukee, Wis.
Stockham Pipe Fittings Co., Birmingham, Ala.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J. (hydraulic service)
Weatherhead Co., Cleveland, O.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, BALANCING, FOR FORCED HOT WATER HEATING SYSTEMS

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Hammond Brass Works, Hammond, Ind.

Homestead Valve Mfg. Co., Coraopolis, Pa.
Marsh Valve Co., Dunkirk, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
● Trane Co., The, La Crosse, Wis.

VALVES, BAR STOCK

Cooper Co., Clark, Palmyra, N. J.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
● Lunkenheimer Co., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.

VALVES, BLOW-OFF

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
● Babcock & Wilcox Co., New York, N. Y.
Barrett Machine Co., Pittsburgh, Pa.
Bordo Co., Inc., L. J., Glenside, Pa.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Edward Valves, Inc., East Chicago, Ind.
Elliott Co., Jeannette, Pa.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., New York, N. Y.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
Keckley Co., O. C., Chicago, Ill.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● McDonnell & Miller, Inc., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
● Ohio Injector Co., Wadsworth, O.
O'Malley Valve Co., Edward, Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Powell Co., Wm., Cincinnati, O.
Schade Valve Co., Philadelphia, Pa.
● Walworth Co., New York, N. Y.
Wilson Engineering Corp., Chicago, Ill.
● Yarnall-Waring Co., Philadelphia, Pa.

VALVES, CHECK

Aeroquip Corp., Jackson, Mich.
Albright Equipment Co., Johnstown, Pa.
Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Hard Rubber Co., New York, N. Y. (Rubber lined)
Barrett, Haentjens & Co., Hazleton, Pa.
Belfield Co., H., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., Detroit, Mich.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Clayton Mfg. Co., El Monte, Calif.
Cochrane Corp., Philadelphia, Pa.
Cooper Alloy Foundry Co., Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Electric Sprayit Co., The, Sheboygan, Wis.
Electrol, Inc., Kingston, N. Y.
Fairbanks Co., New York, N. Y.
Foster Engineering Co., Newark, N. J.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Greer Hydraulics, Inc., Brooklyn, N. Y.
● Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hammond Brass Works, Hammond, Ind.
Harvey, Inc., Sid, Valley Stream, N. Y.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
● Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mansfield & Green, Cleveland, O.
Milwaukee Valve Co., Milwaukee, Wis.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Norgren Co., C. A., Denver, Colo.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
O'Malley Valve Co., Edward, Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Pokorney Mfg. Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Ruggles-Kingemann Mfg. Co., Salem, Mass. (Bleeder type)
Schutte & Koerting Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Shank Co., Cyrus, Chicago, Ill.
Smolensky Valve Co., Inc., Bedford, O.
Stockham Pipe Fittings Co., Birmingham, Ala.
Stokes Molded Products, Trenton, N. J. (Hard rubber)
● Strong, Carlisle & Hammond Co., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J. (hydraulic service)
Weatherhead Co., Cleveland, O.
White Flomatic Corp., Hoosick Falls, N. Y.
Whittaker Co., Wm. R., Los Angeles, Calif.
Williams Gauge Co., The, Pittsburgh, Pa. (Noiseless)
Williams Valve Co., D. T., Cincinnati, O.

VALVES, COMPRESSOR

Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chicago Seal Co., Chicago, Ill.
Clayton Mfg. Co., El Monte, Calif.
Detroit Stamping Co., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
● Frick Co., Waynesboro, Pa.
● Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
● Lunkenheimer Co., Cincinnati, O.
Mueller Brass Co., Port Huron, Mich.
OPW Corp., Cincinnati, O.
● Ohio Injector Co., Wadsworth, O.
Voss Co., J. H. H., New York, N. Y.

VALVES, DIAPHRAGM

American Hard Rubber Co., New York, N. Y. (Rubber lined)
Atlas Valve Co., Inc., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Belfield Co., H., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bristol Co., The, Waterbury, Conn.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clayton Mfg. Co., El Monte, Calif.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Reading, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Fischer & Porter Co., Hatboro, Pa.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Foxboro Co., Foxboro, Mass.
Gates Engineering Co., Wilmington, Del.
General Ceramics Co., Keasbey, N. J. (Chemical stoneware)
● General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
● Grinnell Co., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
● Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
● Henry Valve Co., Chicago, Ill.
Hunt & Son, Inc., H. B., Salem, O.
● Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
● Johnson Service Co., Milwaukee, Wis.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
● Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
Leslie Co., Lyndhurst, N. J.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

● **Advertisement in this issue.** See Index to Advertisers, page 416

Mueller Brass Co., Port Huron, Mich.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Norgren Co., C. A., Denver, Colo.
North American Mfg. Co., Cleveland, O.
Parks-Cramer Co., Fitchburg, Mass.
Penn Industrial Equipment Corp., Philadelphia, Pa.
Powers Regulator Co., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Ross Valve Mfg. Co., Inc., Troy, N. J.
Ruggles-Kingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Staples & Pfeiffer, San Francisco, Calif.
● Swartwout Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
● Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
● White-Rodgers Electric Co., St. Louis, Mo.

VALVES, FIRE PROTECTION, SPRINKLER SYSTEM CONTROL

● Barber-Colman Co., Rockford, Ill.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hodgman Mfg. Co., Taunton, Mass.
● Jenkins Bros., New York, N. Y.
● Kennedy Valve Mfg. Co., The, Elmira, N. Y.
● Ohio Injector Co., Wadsworth, O.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwood Sprinkler Co., Worcester, Mass.

VALVES, FLOAT

Albright Equipment Co., Johnstown, Pa.
● Alco Valve Co., St. Louis, Mo.
American Hard Rubber Co., New York, N. Y. (Hard rubber)
Atlas Valve Co., Inc., Newark, N. J.
● Automatic Products Co., Milwaukee, Wis. (Oil)
Bailey Co., Chas. M., San Francisco, Calif.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Belfield Co., H., Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Caldwell Co., W. E., Louisville, Ky.
● Cash Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Clayton Mfg. Co., El Monte, Calif.
Cleveland Humidifier Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Reading, Pa.
● Detroit Lubricator Co., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
● Frick Co., Waynesboro, Pa.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
● Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Locke Regulator Co., Salem, Mass.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
● Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
● McDonnell & Miller, Inc., Chicago, Ill.
Monash-Younker Co., Chicago, Ill.
Morey, Dan, Los Angeles, Calif.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Perfex Corp., Milwaukee, Wis.
Phillips & Co., H. A., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
● Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Schutte & Koerting Co., Philadelphia, Pa.
Skuttle Mfg. Co., Detroit, Mich.

Spence Engineering Co., Inc., Walden, N. Y.
● Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialities Co., Indianapolis, Ind.
● Swartwout Co., Cleveland, O.
Viking Air Conditioning Corp., Cleveland, O.
Watts Regulator Co., Lawrence, Mass.

VALVES, FLOW CONTROL, FOR HOT WATER HEATING SYSTEMS

● Barber-Colman Co., Rockford, Ill.
● Bell & Gossett Co., Morton Grove, Ill.
Catskill Metal Works, Inc., Catskill, N. Y.
Hammel-Dahl Co., Providence, R. I.
Hook & Ackerman, Inc., New York, N. Y.
● Illinois Engineering Co., Chicago, Ill.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Sall Bros. Co., Rockford, Ill.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
● Taco Heaters, Inc., New York, N. Y.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
W-H Engineering Co., Chicago, Ill.
White Flomatic Corp., Hoosick Falls, N. Y.

VALVES, FORGED STEEL

Albright Equipment Co., Johnstown, Pa.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Clayton Mfg. Co., El Monte, Calif.
Conoflow Corp., Philadelphia, Pa.
Cochrane Corp., Philadelphia, Pa.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Edward Valves, Inc., East Chicago, Ind.
Grove Regulator Co., Oakland, Calif.
● Henry Valve Co., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Ohio Injector Co., Wadsworth, O.
O'Malley Valve Co., Edward, Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
R-S Products Corp., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Steel Improvement & Forge Co., Cleveland, O.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
● Watson-Stillman Co., Roselle, N. J.

VALVES, GATE, ALLOY

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Edward Valves, Inc., East Chicago, Ind.
Electric Steel Foundry Co., Portland, Ore.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hydro-Aire, Inc., Burbank, Calif.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
● Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
● Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, GATE, BRASS AND BRONZE

● American Brass Co., Waterbury, Conn.
Belknap Mfg. Co., Bridgeport, Conn.
Bordo Co., Inc., L. J., Glenside, Pa.
Capitol Brass Works, Div. of Bohn Aluminum Brass Corp., Detroit, Mich.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., Inc., T. E., New York, N. Y.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Darling Valve Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Eddy Valve Co., Waterford, N. Y.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., New York, N. Y.
Hammond Brass Wks., Hammond, Ind.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.

● Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Tin lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Milwaukee Valve Co., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Stockman Pipe Fittings Co., Birmingham, Ala.
● Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, GATE, IRON BODY

Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., New York, N. Y.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
● Kennedy Valve Mfg. Co., Elmira, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
Ludlow Valve Mfg. Co., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mueller Co., Decatur, Ill.
● Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Co., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Scott Valve Mfg. Co., Detroit, Mich.
Semet-Solvay Engineering Corp., New York, N. Y.
Stockham Pipe Fittings Co., Birmingham, Ala.
● Walworth Co., New York, N. Y.
Whittaker Co., Wm. R., Los Angeles, Calif.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, GATE, MALLEABLE IRON

● Crane Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.

VALVES, GATE, STEEL

Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
● Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Edward Valves, East Chicago, Ind.
Everlasting Valve Co., Jersey City, N. J.
Hamer Oil Tool Co., Long Beach, Calif.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, GLOBE, ALLOY

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Edward Valves, Inc., East Chicago, Ind.
Electric Steel Foundry Co., Portland, Ore.
Grove Regulator Co., Oakland, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.
● Henry Valve Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Klingerit, Inc., New York, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
● Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
● Walworth Co., New York, N. Y.

VALVES, GLOBE, BRASS AND BRONZE

● American Brass Co., Waterbury, Conn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belfield Co., H., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Bowser, Inc., Fort Wayne, Ind.
California Brass Mfg. Co., Los Angeles, Calif.
Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., Detroit, Mich.
Central Valve Mfg. Co., Chicago, Ill.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Clayton Mfg. Co., El Monte, Calif.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Fairbanks Co., New York, N. Y.
● Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hammond Brass Wks., Hammond, Ind.
● Henry Valve Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
● Kennedy Valve Mfg. Co., Elmira, N. Y.
Klingerit, Inc., New York, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Milwaukee Valve Co., Milwaukee, Wis.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
O'Malley Valve Co., Edward, Chicago, Ill.
Ostlind Valve, Inc., Portland, Ore.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Pipe Fittings Co., Birmingham, Ala.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J. (hydraulic service)
Weatherhead Co., Cleveland, O.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, GLOBE, IRON BODY

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belfield Co., H., Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Clayton Mfg. Co., El Monte, Calif.
● Crane Co., Chicago, Ill.
Cyrus Shank Co., Chicago, Ill.
Fairbanks Co., New York, N. Y.
● Frick Co., Waynesboro, Pa.
● Grinnell Co., Inc., Providence, R. I.
● Henry Valve Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Jenkins Bros., New York, N. Y.
● Kennedy Valve Mfg. Co., Elmira, N. Y.
Klingerit, Inc., New York, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Shank Co., Cyrus, Chicago, Ill.
● Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, GLOBE, MALLEABLE IRON

Clayton Mfg. Co., El Monte, Calif.
● Crane Co., Chicago, Ill.
● Henry Valve Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.

VALVES, GLOBE, STEEL

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belfield Co., H., Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Clayton Mfg. Co., El Monte, Calif.
● Crane Co., Chicago, Ill.
Edward Valves, Inc., East Chicago, Ind.
Grove Regulator Co., Oakland, Calif.
● Henry Valve Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Klingerit, Inc., New York, N. Y.

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Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Ohio Injector Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Parker Appliance Co., The, Cleveland, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Shank Co., Cyrus, Chicago, Ill.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J.

VALVES, LINED

American Hard Rubber Co., New York, N. Y. (Rubber lined)
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Goodrich Co., B. F., Akron, O. (Rubber lined)
Darling Valve & Mfg. Co., Williamsport, Pa.
● Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis. (Rubber)
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
McAlear Mfg. Co., Chicago, Ill.
National Lead Co., New York, N. Y. (Lead)
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
Schutte & Koerting Co., Philadelphia, Pa. (Lead)
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.

VALVES, MIXING, HOT AND COLD WATER

Bailey Co., Chas. M., San Francisco, Calif.
Clayton Mfg. Co., El Monte, Calif.
● Dole Valve Co., The, Chicago, Ill.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● General Fittings Co., Providence, R. I.
Holby Valve Co., New York, N. Y.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
McAlear Mfg. Co., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Chicago, Ill.
Rooke Co., Leonard, Providence, R. I.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Thermo-Mix, Inc., Long Island City, N. Y.
Watts Regulator Co., Lawrenceville, Mass.

VALVES, MIXING, STEAM AND WATER

Central Brass Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● General Fittings Co., Providence, R. I.
Hammel-Dahl Co., Providence, R. I.
● Johnson Service Co., Milwaukee, Wis.
Leonard Valve Co., Providence, R. I.
Powers Regulator Co., Chicago, Ill.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Vapor Car Heating Co., Inc., Chicago, Ill.

VALVES, MOTOR OPERATED

● Alco Valve Co., St. Louis, Mo.
Armstrong Control Co., Inc., Portland, Ore.
● Autempco Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
● Barber-Colman Co., Rockford, Ill.
● Bell & Gossett Co., Morton Grove, Ill.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cochrane Corp., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Foxboro Co., Foxboro, Mass.
● General Controls Co., Glendale, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.
Homestead Valve Mfg. Co., Coraopolis, Pa.
● Illinois Engineering Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
● Kennedy Valve Mfg. Co., Elmira, N. Y.
● Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Mason-Neilan Regulator Co., Boston, Mass.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa.
North American Mfg. Co., Cleveland, O.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Powell Co., Wm., Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Renssalear Valve Co., Cohoes, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte & Koerting Co., Philadelphia, Pa.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Tallmadge & Co., Webster, East Orange, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vapor Car Heating Co., Inc., Chicago, Inc.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.
Webster Tallmadge & Co., East Orange, N. J.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, NEEDLE

Alloy Steel Products Co., Linden, N. J. (Stainless steel).
● Automatic Products Co., Milwaukee, Wis. (Oil).
Beckett & Co., Inc., Thomas, Dallas, Tex.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Clayton Mfg. Co., El Monte, Calif.
Cooper Alloy Foundry Co., Hillside, N. J.
● Crane Co., Chicago, Ill.
Cyrus Shank Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
● Detroit Lubricator Co., Detroit, Mich.
Edward Valves, Inc., East Chicago, Ind.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
● Henry Valve Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
● Lunkenheimer Co., Cincinnati, O.
● Maid-O'-Mist, Inc., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
McAlear Mfg. Co., Chicago, Ill.
● McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia.
Norgren Co., C. A., Denver, Colo.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
Parker Appliance Co., The, Cleveland, O.
Patrol Valve Co., The, Cleveland, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Shank Co., Cyrus, Chicago, Ill.
Swift Lubricator Co., Elmira, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
● Walworth Co., New York, N. Y.
● Watson-Stillman Co., Roselle, N. J. (Hydraulic service).
Webster Electric Co., Racine, Wis. (Pressure regulating valve for oil burners).
Williams Valve Co., D. T., Cincinnati, O.

VALVES, PLASTIC

Haveg Corp., Newark, Del.

VALVES, PLUG

Alten's Foundry & Machine Works, Lancaster, O.
American Car & Foundry Co., New York, N. Y.
Andale Co., Philadelphia, Pa.
Barret, Haentjens & Co., Hazleton, Pa.
Barrett Machine Co., Pittsburgh, Pa.
Blackburn-Smith Mfg. Co., Hoboken, N. J.
Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cooper Alloy Foundry Co., Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
Duriron Co., Inc., Dayton, O. (Acid resisting).
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Fairbanks Co., New York, N. Y.
General Ceramics Co., Keasbey, N. J. (Chemical stoneware)
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.

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Grove Regulator Co., Oakland, Calif.
Hamer Oil Tool Co., Long Beach, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hydro-Aire, Inc., Burbank, Calif.
Imperial Brass Mfg. Co., Chicago, Ill.
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
● Jenkins Bros., New York, N. Y.
● Kennedy Valve Mfg. Co., Elmira, N. Y.
Klingerit, Inc., New York, N. Y.
Knight, Maurice A., Akron, O. (Stoneware).
Luzerne Rubber Co., Trenton, N. J. (Hard rubber).
Mueller Co., Decatur, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa. (Lubricated).
● Ohio Injector Co., Wadsworth, O.
O'Malley Valve Co., Edward, Chicago, Ill.
Ostlind Valve, Inc., Portland, Ore.
Parker Appliance Co., The, Cleveland, O.
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Stockham Pipe Fittings Co., Birmingham, Ala.
Taylor Instrument Companies, Rochester, N. Y.
● Walworth Co., New York, N. Y.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.
Williams Valve Co., D. T., Cincinnati, O.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, PRESSURE REDUCING AND REGULATING, AIR AND GAS

Atlas Valve Co., Inc., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Beaton-Cadwell Mfg. Co., New Britain, Conn.
Belfield Co., H., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Clayton Mfg. Co., El Monte, Calif.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Regulator and Instrument Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Reading, Pa.
DeVilbiss Co., The, Toledo, O.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
● General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
● Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Harris Calorific Co., The, Cleveland, O.
● Henry Valve Co., Chicago, Ill.
● Hoffman Specialty Co., Indianapolis, Ind.
Hubbell Corp., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Liquid Carbonic Corp., The, Chicago, Ill.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Denver, Colo.
Northern Equipment Co., Erie, Pa.
Powers Regulator Co., Chicago, Ill.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Skaneateles Mfg. Co., Inc., Syracuse, N. Y.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Sullivan Valve & Engineering Co., Butte, Mont.
● Swartwout Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
● Thrush & Co., H. A., Peru, Ind.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Watts Regulator Co., Lawrence, Mass.

VALVES, PRESSURE REDUCING AND REGULATING, HOT WATER

Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Boylston Steam Specialty Co., Chicago, Ill.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Reading, Pa.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Powers Regulator Co., Chicago, Ill.
Republic Flow Meters Co., Chicago, Ill.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Watts Regulator Co., Lawrence, Mass.

VALVES, PRESSURE REDUCING AND REGULATING, STEAM

● American District Steam Co., North Tonawanda, N. Y.
Atlas Valve Co., Inc., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Belfield Co., H., Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., American Chain & Cable Co., Reading, Pa.
● Dunham Co., C. A., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
● Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
● Hoffman Specialty Co., Indianapolis., Ind.
Hubbell Corp., Chicago, Ill.
● Illinois Engineering Co., Chicago, Ill.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Mfg. Co., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.

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McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Northern Equipment Co., Erie, Pa.
Powers Regulator Co., Chicago, Ill.
Republic Flow Meters Co., Chicago, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Stickle Steam Specialties Co., Indianapolis, Ind.
● Strong, Carlisle & Hammond Co., Cleveland, O.
● Swartwout Co., Cleveland, O.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.,
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vapor Car Heating Co., Inc., Chicago, Ill.
Watts Regulator Co., Lawrence, Mass.

VALVES, PUMP

Anchor Packing Co., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Clayton Mfg. Co., El Monte, Calif.
Dick Co., Inc., R. & J., Passaic, N. J.
Durabla Mfg. Co., New York, N. Y.
Garlock Packing Co., Palmyra, N. Y.
Goodrich Co., B. F., Akron, O.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
United States Rubber Company, New York, N. Y.
Williams Gauge Co., The, Pittsburgh, Pa.

VALVES, RADIATOR, AIR

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Anderson Products, Inc., Cambridge, Mass.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Curtis Automotive Devices, Inc., Dayton, O.
● Dole Valve Co., The, Chicago, Ill.
Gorton Heating Co., Cranford, N. J.
● Hoffman Specialty Corp., Indianapolis, Ind.
Keeney Mfg. Co., Newington, Conn.
Little Mfg. Co., M. S., Hartford, Conn.
● Maid-O'-Mist, Inc., Chicago, Ill. (Humidifying)
Majot Automatic Machine Co., Inc., East Orange, N. J.
McAlear Mfg. Co., Chicago, Ill.
New York Air Valve Corp., New York, N. Y.
Positive Control Co., The, Cincinnati, O.
Powers Regulator Co., Chicago, Ill.
Sullivan Valve & Engineering Co., Butte, Mont.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, ELECTRIC

● Barber-Colman Co., Rockford, Ill.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Sarcotherm Controls, Inc., New York, N. Y.
Vapor Car Heating Co., Inc., Chicago, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, PNEUMATIC

Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
● Johnson Service Co., Milwaukee, Wis.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Chicago, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, SELF-CONTAINED

Edison, Inc., Thos. A., Instrument Div., West Orange, N. J.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Majot Automatic Machine Co., Inc., East Orange, N. J.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Chicago, Ill.
● Sterling, Inc., Milwaukee, Wis.
● Trane Co., The, LaCrosse, Wis.

VALVES, RADIATOR, ORIFICE

● American District Steam Co., North Tonawanda, N. Y.
● Autempco Corp., New York, N. Y.
Barnes & Jones, Inc., Boston, Mass.
● Dunham Co., C. A., Chicago, Ill.
● Grinnell Co., Inc., Providence, R. I.
● Illinois Engineering Co., Chicago, Ill.
Marsh Valve Co., Dunkirk, N. Y.
New York Air Valve Corp., New York, N. Y.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
● Trane Co., The, LaCrosse, Wis.
● Webster & Co., Warren, Camden, N. J.

VALVES, RADIATOR, STEAM AND HOT WATER, HAND

● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Belfield Co., H., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., Detroit, Mich.
Chase Brass & Copper Co., Waterbury, Conn.
● Crane Co., Chicago, Ill.
● Dunham Co., C. A., Chicago, Ill.
Fairbanks Co., New York, N. Y.
● Grinnell Co., Inc., Providence, R. I.
● Haines & Co., William S., Philadelphia, Pa.
Hammond Brass Wks., Hammond, Ind.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
● Kennedy Valve Mfg. Co., Elmira, N. Y.
● Lunkenheimer Co., Cincinnati, O.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Northern Indiana Brass Co., Elkhart, Ind.
Ohio Brass Co., Mansfield, O.
● Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Scott Valve Mfg. Co., Detroit, Mich.
● Sterling, Inc., Milwaukee, Wis.
● Trane Co., The, La Crosse, Wis.
● Webster & Co., Warren, Camden, N. J.
Williams Valve Co., D. T., Cincinnati, O.

VALVES, RADIATOR, STEAM AND HOT WATER, MODULATING

● American District Steam Co., North Tonawanda, N. Y.
● American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Barnes & Jones, Inc., Boston, Mass.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Cashin Co., W. D., Boston, Mass.
Cryer Trap & Valve Co., Inc., New York, N. Y.
● Dunham Co., C. A., Chicago, Ill.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
● Haines & Co., William S., Philadelphia, Pa.
● Hoffman Specialty Co., Indianapolis, Ind.
● Illinois Engineering Co., Chicago, Ill.
● Jenkins Bros., New York, N. Y.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
McAlear Mfg. Co., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mouat Vapor Heating Co., The, Cleveland, O.
Ohio Brass Co., Mansfield, O.
● Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
● Sterling, Inc., Milwaukee, Wis.
Tallmadge & Co., Webster, East Orange, N. J.
Vapor Specialty Co., New York, N. Y.
● Webster & Co., Warren, Camden, N. J.
Webster Tallmadge & Co., East Orange, N. J.

VALVES, REFRIGERATION (ANGLE, CHECK, GATE, GLOBE, NEEDLE, RELIEF)

● Baker Ice Machine Co., Inc., Omaha, Neb.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Central Brass Mfg. Co., Cleveland, O.
● Crane Co., Chicago, Ill.
Cyrus Shank Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Detroit Stamping Co., Detroit, Mich.
● Frick Co., Waynesboro, Pa.
Hammel-Dahl Co., Providence, R. I.
● Henry Valve Co., Chicago, Ill.
Hubbell Corp., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.

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● Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Klingerit, Inc., New York, N. Y.
Lonergan Co., J. E., Philadelphia, Pa.
● Lunkenheimer Co., Cincinnati, O.
Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., The, Cleveland, O.
Peerless of America, Inc., Chicago, Ill.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Shank Co., Cyrus, Chicago, Ill.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Triumph Ice Machine Co., Cincinnati, O.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
● Walworth Co., New York, N. Y.
Weatherhead Co., Cleveland, O.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

VALVES, REFRIGERATION, BACK PRESSURE

● Alco Valve Co., St. Louis, Mo.
Bailey Co., Chas. M., San Francisco, Calif.
● Cash Co., A. W., Decatur, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Electrimatic, Chicago, Ill.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
Hammel-Dahl Co., Providence, R. I.
● Henry Valve Co., Chicago, Ill.
Hubbell Corp., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
Temprite Products Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

VALVES, REFRIGERATION, EXPANSION, CONSTANT PRESSURE

● Alco Valve Co., St. Louis, Mo.
● Automatic Products Co., Milwaukee, Wis.
Baker Ice Machine Co., Inc., South Windham, Me.
● Cash Co., A. W., Decatur, Ill.
● Detroit Lubricator Co., Detroit, Mich.
Foster Engineering Co., Newark, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Mayson Mfg. Co., Inc., Detroit, Mich.
Peerless of America, Inc., Chicago, Ill.
Tenney Engineering, Inc., Newark, N. J.
Vilter Mfg. Co., Milwaukee, Wis.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

VALVES, REFRIGERATION, EXPANSION, THERMOSTATIC

● Alco Valve Co., St. Louis, Mo.
● Automatic Products Co., Milwaukee, Wis.
● Detroit Lubricator Co., Detroit, Mich.
Frigidaire Div., General Motors Corp., Dayton, O.
● General Controls Co., Glendale, Calif.
Mayson Mfg. Co., Inc., Detroit, Mich.
Peerless of America, Inc., Chicago, Ill.
● Sporlan Valve Co., St. Louis, Mo.
Tenney Engineering, Inc., Newark, N. J.
X L Refrigerating Co., Chicago, Ill.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE

● Alco Valve Co., St. Louis, Mo.
American Injector Co., Detroit, Mich.
Foster Engineering Co., Newark, N. J.
● Frick Co., Waynesboro, Pa.
Hubbell Corp., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Magnetrol, Inc., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
Phillips & Co., H. A., Chicago, Ill.
Temprite Products Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Voss Co., J. H. H., New York, N. Y.
Wabash Mfg. Co., Chicago, Ill.
Weatherhead Co., Cleveland, O.
● Worthington Pump & Machinery Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
● York Corp., York, Pa.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE AND LOW PRESSURE

Mayson Mfg. Co., Inc., Detroit, Mich.
Temprite Products Corp., Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Voss Co., J. H. H., New York, N. Y.

VALVES, REFRIGERATION, LIQUID CONTROL, FLOAT PILOTED

● Alco Valve Co., St. Louis, Mo.
Clayton Mfg. Co., El Monte, Calif.
Phillips & Co., H. A., Chicago, Ill.

VALVES, REFRIGERATION, MAGNETIC STOP

● Alco Valve Co., St. Louis, Mo.
● Automatic Products Co., Milwaukee, Wis.
Automatic Switch Co., Orange, N. J.
Cooper Co., Clark, Palmyra, N. Y.
● Detroit Lubricator Co., Detroit, Mich.
Electrimatic, Chicago, Ill.
● Frick Co., Waynesboro, Pa.
● General Controls Co., Glendale, Calif.
● Henry Valve Co., Chicago, Ill.
Hubbell Corp., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
● Penn Electric Switch Co., Goshen, Ind.
● Sporlan Valve Co., St. Louis, Mo.

VALVES, REFRIGERATION, WATER REGULATING, PRESSURE OR TEMPERATURE ACTUATED

American Injector Co., Detroit, Mich.
Art Valve Co., Chicago, Ill.
● Automatic Products Co., Milwaukee, Wis.
Bailey Co., Chas. M., San Francisco, Calif.
● Cash Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cyrus Shank Co., Chicago, Ill.
Electrimatic, Chicago, Ill.
Farris Engineering Corp., Palisades Park, N. J.
● Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
● Henry Valve Co., Chicago, Ill.
Hubbell Corp., Chicago, Ill.
● Kieley & Mueller, Inc., North Bergen, N. J.
Mayson Mfg. Co., Detroit, Mich.
● Mercoid Corp., Chicago, Ill.
Mueller Co., Decatur, Ill.
● Penn Electric Switch Co., Goshen, Ind.
Perfection Refrigeration Parts Co., Harvey, Ill.
● Sarco Co., Inc., New York, N. Y.
Shank Co., Cyrus, Chicago, Ill.
Spence Engineering Co., Inc., Walden, N. Y.
Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.

VALVES, RELIEF, HOT WATER, COMBINED PRESSURE AND TEMPERATURE OPERATED

Beaton & Cadwell Mfg. Co., New Britain, Conn.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
Farris Engineering Corp., Palisades Park, N. J.
● Fisher Governor Co., Marshalltown, Ia.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Kainer & Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Patrol Valve Co., The, Cleveland, O.
Sall Bros. Co., Rockford, Ill.
Spencer Thermostat Co., Attleboro, Mass.
● Thrush & Co., H. A., Peru, Ind.
● Trane Co., The, La Crosse, Wis.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED

Ashton Valve Co., Cambridge, Mass.
Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.

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- Davis Regulator Co., Chicago, Ill.
- d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
- Durabla Mfg. Co., New York, N. Y.
- Eddy Valve Co., Waterford, N. Y.
- Edward Valves, Inc., East Chicago, Ind.
- Farris Engineering Corp., Palisades Park, N. J.
- ● Fisher Governor Co., Marshalltown, Ia.
- Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
- Kainer & Co., Chicago, Ill.
- Kehm Corp., The, Chicago, Ill.
- ● Kieley & Mueller, Inc., North Bergen, N. J.
- Klipfel Mfg. Co., Chicago, Ill.
- Kunkle Valve Co., Ft. Wayne, Ind.
- Lonergan Co., J. E., Philadelphia, Pa.
- Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
- Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., Skokie, Ill.
- McAlear Mfg. Co., Chicago, Ill.
- ● McDonnell & Miller, Inc., Chicago, Ill.
- Milwaukee Valve Co., Milwaukee, Wis.
- Mueller Co., Decatur, Ill.
- Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
- Neptune Meter Co., New York, N. Y.
- OPW Corp., Cincinnati, O.
- Parker Appliance Co., The, Cleveland, O.
- Patrol Valve Co., The, Cleveland, O.
- Ross Valve Mfg. Co., Inc., Troy, N. Y.
- Sall Bros. Co., Rockford, Ill.
- Sarcotherm Controls, Inc., New York, N. Y.
- Schade Valve Mfg. Co., Philadelphia, Pa.
- Scott Valve Mfg. Co., Detroit, Mich.
- Spencer Thermostat Co., Attleboro, Mass.
- Staples & Pfeiffer, San Francisco, Calif.
- Sullivan Valve & Engineering Co., Butte, Mont.
- ● Swartwout Co., Cleveland, O.
- ● Taco Heaters, Inc., New York, N. Y.
- Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
- ● Thrush & Co., H. A., Peru, Ind.
- ● Trane Co., The, LaCrosse, Wis.
- Triplex Heating Specialty Co., Inc., Peru, Ind.
- Tryco Products, Inc., Westfield, Mass.
- Watson & McDaniel Co., Philadelphia, Pa.
- Watts Regulator Co., Lawrence, Mass.
- Welsbach Corp., The, Kitson Div., Philadelphia, Pa.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED, SELF-FILLING

- Bailey Co., Chas. M., San Francisco, Calif.
- Beaton & Cadwell Mfg. Co., New Britain, Conn.
- ● Bell & Gossett Co., Morton Grove, Ill.
- Cash Valve Mfg. Co., A. W., Decatur, Ill.
- ● Crane Co., Chicago, Ill.
- Kehm Corp., The, Chicago, Ill.
- ● Kieley & Mueller, Inc., North Bergen, N. J.
- Mueller Co., Decatur, Ill.
- Sall Bros. Co., Rockford, Ill.
- Sarcotherm Controls, Inc., New York, N. Y.
- ● Thrush & Co., H. A., Peru, Ind.
- Watts Regulator Co., Lawrence, Mass.

VALVES, RELIEF, OIL

- Andale Co., Philadelphia, Pa.
- Ashton Valve Co., Cambridge, Mass.
- Atlas Valve Co., Inc., Newark, N. J.
- Bailey Co., Chas. M., San Francisco, Calif.
- Black-Sivalls & Bryson, Inc., Kansas City, Mo.
- ● Cash Co., A. W., Decatur, Ill.
- Cash Valve Mfg. Co., A. W., Decatur, Ill.
- Clayton Mfg. Co., El Monte, Calif.
- Cooper Co., Clark, Palmyra, N. J.
- ● Crane Co., Chicago, Ill.
- Durabla Mfg. Co., New York, N. Y.
- Electrol, Inc., Kingston, N. Y.
- Farris Engineering Corp., Palisades Park, N. J.
- ● Fisher Governor Co., Marshalltown, Ia.
- Fulflo Specialties Co., Inc., The, Blanchester, O.
- Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
- Greer Hydraulics, Inc., Brooklyn, N. Y.
- Grove Regulator Co., Oakland, Calif.
- Hammel-Dahl Co., Providence, R. I.
- Harvey, Inc., Sid, Valley Stream, N. Y.
- Keckley Co., O. C., Chicago, Ill.
- Kunkle Valve Co., Ft. Wayne, Ind.
- Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
- Locke Regulator Co., Salem, Mass.
- Lonergan Co., J. E., Philadelphia, Pa.
- ● Lunkenheimer Co., Cincinnati, O.
- Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
- Milwaukee Valve Co., Milwaukee, Wis.
- Monarch Mfg. Works, Inc., Philadelphia, Pa.
- Morrison Brothers Co., Dubuque, Ia.
- Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
- Parker Appliance Co., The, Cleveland, O.
- Preferred Utilities Mfg. Corp., New York, N. Y.
- Schade Valve Mfg. Co., Philadelphia, Pa.
- Scott Valve Mfg. Co., Detroit, Mich.
- Staples & Pfeiffer, San Francisco, Calif.
- Thermix Corp., The, Greenwich, Conn.

VALVES, SADDLE

- Beckett & Co., Inc., Thomas, Dallas, Tex.
- Darling Valve & Mfg. Co., Williamsport, Pa.
- Fairbanks Co., New York, N. Y.
- Imperial Brass Mfg. Co., Chicago, Ill.
- ● Maid-O'-Mist, Inc., Chicago, Ill.
- ● Ohio Injector Co., Wadsworth, O.
- ● Walworth Co., New York, N. Y.

VALVES, SAFETY, STEAM

- Ashton Valve Co., Cambridge, Mass.
- Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., Detroit, Mich.
- Cooper Co., Clark, Palmyra, N. J.
- ● Crane Co., Chicago, Ill.
- Eclipse Fuel Engineering Co., Rockford, Ill.
- Farris Engineering Corp., Palisades Park, N. J.
- Foster Engineering Co., Newark, N. J.
- Kunkle Valve Co., Ft. Wayne, Ind.
- Lonergan Co., J. E., Philadelphia, Pa.
- ● Lunkenheimer Co., Cincinnati, O.
- Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
- North American Mfg. Co., Cleveland, O.
- Powell Co., Wm., Cincinnati, O.
- Scott Valve Mfg. Co., Detroit, Mich.

VALVES, SOLDER JOINT

- ● American Brass Co., Waterbury, Conn.
- Chase Brass & Copper Co., Waterbury, Conn.
- Cleveland Brass Mfg. Co., The, Cleveland, O.
- ● Crane Co., Chicago, Ill.
- Darling Valve & Mfg. Co., Williamsport, Pa.
- Fairbanks Co., New York, N. Y. (Silver braze joints)
- Hammond Brass Works, Hammond, Ind.
- ● Henry Valve Co., Chicago, Ill.
- Imperial Brass Mfg. Co., Chicago, Ill.
- ● Jenkins Bros., New York, N. Y.
- Kerotest Mfg. Co., Pittsburgh, Pa.
- Mueller Brass Co., Port Huron, Mich.
- Northern Indiana Brass Co., Elkhart, Ind.
- Pittsburgh Valve & Fittings Corp., Barberton, O.
- Powell Co., Wm., Cincinnati, O.
- Scott Valve Mfg. Co., Detroit, Mich.
- ● Walworth Co., New York, N. Y. (Brazed)
- Weatherhead Co., Cleveland, O.

VALVES, SOLENOID

- Albright Equipment Co., Johnstown, Pa.
- ● Alco Valve Co., St. Louis, Mo.
- Allied Control Co., Inc., New York, N. Y.
- Allied Control Valve Div., Skinner Chuck Co., Norwalk, Conn.
- ● Autempco Corp., New York, N. Y.
- ● Automatic Products Co., Milwaukee, Wis.
- Automatic Switch Co., Orange, N. J.
- ● Barber-Colman Co., Rockford, Ill.
- Belfield Co., H., Philadelphia, Pa.
- Blackburn-Smith Mfg. Co., Hoboken, N. J.
- Clayton Mfg. Co., El Monte, Calif.
- Cooper Co., Clark, Palmyra, N. J.
- Cutler-Hammer, Inc., Milwaukee, Wis.
- Davis Regulator Co., Chicago, Ill.
- ● Detroit Lubricator Co., Detroit, Mich.
- Electric Valve Mfg. Co., Inc., New York, N. Y.
- Electrimatic, Chicago, Ill.
- Electrol, Inc., Kingston, N. Y.
- Erickson Specialty Co., Cohoes, N. Y.
- ● Frick Co., Waynesboro, Pa.
- ● General Controls Co., Glendale, Calif.
- General Electric Co., Apparatus Dept., Schenectady, N. Y.
- Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
- Grove Regulator Co., Oakland, Calif.
- Hays Mfg. Co., Erie, Pa.
- ● Henry Valve Co., Chicago, Ill.
- Hook & Ackerman, Inc., New York, N. Y.
- Hubbell Corp., Chicago, Ill.
- Hunt & Son, C. B., Salem, O.
- ● Johnson Corp., The, Three Rivers, Mich.
- Keckley Co., O. C., Chicago, Ill.
- Lammert & Mann Co., Chicago, Ill. (Gas safety shut-off)
- Lonergan Co., J. E., Philadelphia, Pa.
- ● McDonnell & Miller, Inc., Chicago, Ill.
- Milwaukee Gas Specialty Co., Milwaukee, Wis.
- ● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
- ● Nicholson & Co., W. H., Wilkes-Barre, Pa.
- Payne Furnace Co., Beverly Hills, Calif.
- ● Penn Electric Switch Co., Goshen, Ind.
- Pfening Co., Fred D., Columbus, O. (1" water and steam)
- R-S Products Corp., Philadelphia, Pa.
- Ruggles-Klingemann Mfg. Co., Salem, Mass.
- ● Sarco Co., Inc., New York, N. Y.
- Sarcotherm Controls, Inc., New York, N. Y.
- ● Sporlan Valve Co., St. Louis, Mo.
- Square D Co., Industrial Controller Div., Milwaukee, Wis.
- ● Sterling, Inc., Milwaukee, Wis.
- Supreme Electric Products Corp., Rochester, N. Y.
- Locke Regulator Co., Salem, Mass.
- Vapor Car Heating Co., Inc., Chicago, Ill.
- ● White-Rodgers Electric Co., St. Louis, Mo.

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VALVES, 2, 3 AND 4 WAY

Albright Equipment Co., Johnstown, Pa.
● Aloo Valve Co., St. Louis, Mo.
Allied Control Co., Inc., New York, N. Y.
Allied Control Valve Div., Skinner Chuck Co., Norwalk, Conn.
● American Brass Co., Waterbury, Conn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
● Barber-Colman Co., Rockford, Ill.
Belfield Co., H., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bordo Co., Inc., Glenside, Pa.
Bristol Co., The, Waterbury, Conn.
● Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Co., A. W., Decatur, Ill.
Clayton Mfg. Co., El Monte, Calif.
Cooper Co., Clark, Palmyra, N. J.
● Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
● Detroit Lubricator Co., Detroit, Mich.
Farris Engineering Corp., Palisades Park, N. J.
● Fisher Governor Co., Marshalltown, Ia.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
● General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
● Henry Valve Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hunt & Son, C. B., Salem, O.
Hydro-Aire, Inc., Burbank, Calif.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
● Johnson Service Co., Milwaukee, Wis.
Keller Tool Co., Grand Haven, Mich.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lonergan Co., J. E., Philadelphia, Pa.
● Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
McAlear Mfg. Co., Chicago, Ill.
● Mercoid Corp., Chicago, Ill.
● Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
● Nicholson & Co., W. H., Wilkes-Barre, Pa.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Parker Appliance Co., The, Cleveland, O.
● Penn Electric Switch Co., Goshen, Ind.
Powell Co., Wm., Cincinnati, O.
Powers Regulator Co., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
● Walworth Co., New York, N. Y. (Lubricated plug valves)
● Watson-Stillman Co., Roselle, N. J. (Hydraulic service)
Weatherhead Co., Cleveland, O.
Williams Valve Co., D. T., Cincinnati, O.

VANES, DUCT TURNING, PREFABRICATED

● Air Devices, Inc., New York, N. Y.
● Anemostat Corp. of America, New York, N. Y. (Equalizing deflectors)
● Barber-Colman Co., Rockford, Ill.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
● Titus Mfg. Corp., Waterloo, Ia.
● Tuttle & Bailey, Inc., New Britain, Conn.

VAPOR HEATING SYSTEMS

See Systems, Heating, Vapor

VARIABLE SPEED DRIVES

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

VARIABLE SPEED PULLEYS

See Changers, Speed, Mechanical

V-BELT DRIVES

See Drives, V-Belt

VELOCITY REGULATORS

See Regulators, Air Velocity

VENT FLUE CAPS

See Caps, Vent Flue

VENTILATING HOSE

See Ducts and Duct Fittings, Prefabricated, Non-Metallic

VENTILATION HEATERS

See Surface, Finned, Heating

VENTILATORS, MUSHROOM

Aeolus Dickinson, Chicago, Ill.
Best Register Co., Milwaukee, Wis.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dickinson, Aeolus, Chicago, Ill.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Knight, Maurice A., Akron, O. (Stoneware)
Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Lumm Co., A. H., Toledo, O.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Penn Ventilating Co., Philadelphia, Pa.
Van Noorden Co., E., Boston, Mass.
Ventilating Products Co., Chicago, Ill.

VENTILATORS, ROOF, FAN

Aeolus Dickinson, Chicago, Ill.
Aerovent Fan Co., Piqua, O.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Airmaster Corp., Chicago, Ill.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
American-Larson Ventilating Co., Pittsburgh, Pa.
American Steel Band Co., Heidelberg, Pa.
Arex Co., Chicago, Ill.
Bar-Brook Mfg. Co., Inc., Shreveport, La.
● Bishop & Babcock Co., Cleveland, O.
Breidert Co., G. C., Los Angeles, Calif.
Burt Mfg. Co., Akron, O.
Century Fan & Ventilator Co., Stamford, Conn.
Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Clay Equipment Corp., Cedar Falls, Ia.
Dana Fan & Blower Corp., Cincinnati, O.
Davidson Hy Duty Roof Fan Co., Newton, Mass.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Diehl Mfg. Co., Somerville, N. J.
Dual Air Fan Co., Chicago, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Fingles Co., The, Baltimore, Md.
Gallaher Co., The, Owatonna, Minn.
Gehri Co., Tacoma, Wash.
Hartzell Propeller Fan Co., Piqua, O.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Howes-Woods Co., Cambridge, Mass.
● Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Johnson Fan & Blower Corp., Chicago, Ill.
Jordan & Co., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
King Co., The, Owatonna, Minn.
Lee & Son Co., Thomas, Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Martin Fan & Blower Co., Chicago, Ill.
Mellish & Murray Co., Chicago, Ill.
Mountain States Equipment Co., Denver, Colo.
Myers Electric Co., Inc., Pittsburgh, Pa.
● Nelson Corp., Herman, Moline, Ill.
New York Blower Co., Chicago, Ill.
Newcomb Engineering Co., Grand Rapids, Mich.
Peerless Electric Co., Warren, O.
Penn Ventilating Co., Philadelphia, Pa.
Phoenix Ventilator Co., Inc., Brooklyn, N. Y.
Power Engineering Co., Chicago, Ill.
Powermatic Ventilator Co., Cleveland, O.
Production Planning Co., Rochester, Mich.
Propellair, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
Schwitzer-Cummins Co., Indianapolis, Ind.
Somers, Inc., H. J., Detroit, Mich.
● Swartwout Co., Cleveland, O.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
● Trane Co., The, LaCrosse, Wis.
Truflo Fan Co., Harmony, Pa.
Uno Ventilator Co., Cliftondale, Mass.
● Utility Appliance Corp., Los Angeles, Calif.
Van Noorden Co., E., Boston, Mass.
Washburn & Co., E. G., New York, N. Y.
Waverly Heating Supply Co., Boston, Mass.
Western Engineering & Mfg. Co., Los Angeles, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wind-Way Fan & Ventilator Co., New Orleans, La.
● Wing Mfg. Co., L. J., New York, N. Y.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
● Young Radiator Co., Racine, Wis.

VENTILATORS, ROOF, GRAVITY

Accurate Sheet Metal Mfg. Works, Chicago, Ill.

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- Aeolus Dickinson, Chicago, Ill.
- Air Control Products, Inc., Coopersville, Mich.
- ● Air Devices, Inc., New York, N. Y.
- Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
- American-Larson Ventilating Co., Pittsburgh, Pa.
- American Metal Products Co., Fort Worth, Tex.
- American Sheet Metal Works, New Orleans, La.
- American Steel Band Co., Heidelberg, Pa.
- Arex Co., Chicago, Ill.
- Autoforce Ventilating System, Boston, Mass.
- Berger Bros. Co., Philadelphia, Pa.
- Breidert Co., G. C., Los Angeles, Calif.
- Burt Mfg. Co., Akron, O.
- Century Fan & Ventilator Co., Stamford, Conn.
- Clay Equipment Corp., Cedar Falls, Ia.
- Danzer Metal Works Co., Hagerstown, Md.
- Day Co., The, Minneapolis, Minn.
- Dickinson, Aeolus, Chicago, Ill.
- Empire Ventilation Equipment Co., Long Island City, N. Y.
- Fingles Co., The, Baltimore, Md.
- Gehri Co., Tacoma, Wash.
- Gelert Co., C. R., Pasadena, Calif.
- Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
- Hirschman-Pohle Co., Inc., LeRoy, N. Y.
- Howes-Woods Co., Cambridge, Mass.
- Inland Steel Products Co., Milwaukee, Wis.
- International Steel Co., Evansville, Ind.
- Iona Ventilator Co., Inc., Philadelphia, Pa.
- Iwan Brothers, South Bend, Ind.
- Jamar Co., Walker, Duluth, Minn.
- Jordan & Co., Paul R., Indianapolis, Ind.
- Kernchen Co., Chicago, Ill.
- King Co., The, Owatonna, Minn.
- Klauer Mfg. Co., Dubuque, Ia.
- Kleenaire Corp., Stevens Point, Wis.
- La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
- Lee & Son Co., Thomas, Cincinnati, O.
- Leslie Welding Co., Chicago, Ill.
- Levow, David, New York, N. Y.
- Lumm Co., A. H., Toledo, O.
- Lyon, Conklin & Co., Inc., Baltimore, Md.
- Mellish & Murray Co., Chicago, Ill.
- Merchant & Evans Co., Philadelphia, Pa.
- Moeschl-Edwards Corrugating Co., Inc., The, Cincinnati, O.
- National Metal Fabricators, Chicago, Ill.
- Newcomb Engineering Co., Grand Rapids, Mich.
- Patten Co., J. V., Sycamore, Ill.
- Penn Ventilating Co., Philadelphia, Pa.
- Phoenix Ventilator Co., Inc., Brooklyn, N. Y.
- Pioneer Roofing & Sheet Metal Co., Muskogee, Okla.
- Production Planning Co., Rochester, Mich.
- Plasteel Products Co., Washington, Pa.
- Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
- Riggin Metal Products, Inc., Kankakee, Ill.
- Robertson Co., H. H., Pittsburgh, Pa.
- Royal Ventilator Co., Philadelphia, Pa.
- St. Paul Corrugating Co., St. Paul, Minn.
- Sheet Metal Mfg. Co., Inc., Brooklyn, N. Y.
- Sioux Steel Co., Sioux Falls, S. D.
- Southbridge Roofing Co., Inc., Southbridge, Mass.
- Souther Iron Co., E. E., St. Louis, Mo.
- Southern States Iron Roofing Co., Savannah, Ga.
- Standard Furnace & Supply Co., Omaha, Neb.
- Standard Ventilator Co., Lewisburg, Pa.
- Steinhorst & Sons, Inc., Emil, Utica, N. Y.
- ● Swartwout Co., Cleveland, O.
- Tierney Rotor Ventilator Co., Minneapolis, Minn.
- Tiffin Eaves Trough Co., Tiffin, O.
- Uno Ventilator Co., Cliftondale, Mass.
- Van Noorden Co., E., Boston, Mass.
- Walker Jamar Co., Duluth, Minn.
- Warner Ventilator Co., La Grange, Ind.
- Western Engineering & Mfg. Co., Los Angeles, Calif.
- Willis Steel Corp., Galesburg, Ill.
- Winkler & Sons, Inc., A. E., Milwaukee, Wis.
- York Corrugating Co., York, Pa.

VENTILATORS, UNIT

- Circulators & Devices Mfg. Corp., New York, N. Y.
- Johnson Fan & Blower Corp., Chicago, Ill.
- ● Nelson Corp., Herman, Moline, Ill.
- ● Nesbitt, Inc., John J., Philadelphia, Pa.
- Peerless Unit Ventilation Co., Inc., Bridgeport, Conn.
- ● Trane Co., The, LaCrosse, Wis.
- Westinghouse Electric Corp., Pittsburgh, Pa.

VIBRATION ABSORBERS

See Absorbers, Vibration

VIBRATION ELIMINATORS

See Absorbers, Vibration; Bases and Pads, Vibration Isolating; Hose, Metal and Fittings

VIBRATION ISOLATORS

See Absorbers, Vibration; Bases and Pads, Vibration Isolating; Hose, Metal and Fittings

VISCOSIMETERS

- American Instrument Co., Silver Spring, Md.
- Brabender Corp., Rochelle Park, N. J.
- Brookfield Engineering Laboratories, Sharon, Mass.
- Daigger & Co., A., Chicago, Ill.
- Fish-Schurman Corp., New York, N. Y.
- General Electric Co., Apparatus Dept., Schenectady, N. Y.
- Giannini Co. Inc., G. M., Pasadena, Calif.
- Greiner Co., Emil, New York, N. Y.
- Humboldt Mfg. Co., Chicago, Ill.
- Monarch Mfg. Works, Inc., Philadelphia, Pa.
- Precision Scientific Co., Chicago, Ill.
- Ruehfel Co., Inc., George, Brooklyn, N. Y.
- Scientific Instrument Co., Detroit, Mich.
- Tagliabue Div., C. J., Portable Products Corp., Brooklyn, N. Y.
- Thomas Co., Arthur H., Philadelphia, Pa.
- Westinghouse Electric Corp., Pittsburgh, Pa.
- Will Corp., Rochester, N. Y.

VISCOUS LIQUID PUMPS

See Pumps, Viscous Liquids

VISES, PIPE

- American Pipe Tool Co., Chicago, Ill.
- Armstrong Bros. Tool Co., Chicago, Ill.
- Armstrong Mfg. Co., Bridgeport, Conn.
- Beaver Pipe Tools, Inc., Warren, O. (Sawing—for tubing)
- Billings & Spencer Co., Hartford, Conn.
- Crown Die & Tool Co., Chicago, Ill.
- Desmond-Stephens Mfg. Co., Urbana, O.
- Erie Tool Wks., Erie, Pa.
- Hollands Mfg. Co., Erie, Pa.
- International Nutyp Tool Co., Oswego, N. Y.
- Munton Mfg. Co., Franklin Park, Ill.
- Nye Tool & Machine Co., Chicago, Ill.
- ● Ridge Tool Co., Elyria, O.
- Sac Tool Mfg. Co., St. Louis, Mo.
- Trimont Mfg. Co., Div. of Aetna Industrial Corp., Roxbury, Mass.
- Vanderman Mfg. Co., Willimantic, Conn.
- ● Williams & Co., J. H., Buffalo, N. Y.
- Yost Mfg. Co., Meadville, Pa.

VISE STANDS

See Stands, Pipe Vise

WALL THERMOSTATS

See Thermostats, Room or Wall

WARM AIR FURNACES

See Furnaces, Warm Air

WASHERS, AIR

- ● Air & Refrigeration Corp., New York, N. Y.
- Airwasher Corp., Lansing, Mich.
- Alton Mfg. Co., Dallas, Tex.
- American Blower Corp., Detroit, Mich.
- Bahnson Co., Winston-Salem, N. C.
- Ballantyne Co., Omaha, Neb.
- Bayley Blower Co., Milwaukee, Wis.
- ● Bishop & Babcock Mfg. Co., Cleveland, O.
- Blower Application Co., Milwaukee, Wis.
- ● Buffalo Forge Co., Buffalo, N. Y.
- ● Carrier Corp., Syracuse, N. Y.
- Centri-Spray Corp., Detroit, Mich. (Wet type)
- ● Clarage Fan Co., Kalamazoo, Mich.
- Columbus Heating & Ventilating Co., Columbus, O.
- Comfort Products Corp., Dallas, Tex.
- Doyle & Roth Mfg. Co., Long Island City, N. Y.
- Drying Systems, Inc., Chicago, Ill.
- Economy Equipment Co., Chicago, Ill.
- Lehigh Fan & Blower Co., Allentown, Pa.
- Mellish & Murray Co., Chicago, Ill.
- Mountain States Equipment Co., Denver, Colo.
- ● Murray Mfg. Co., D. J., Wausau, Wis.
- New York Blower Co., Chicago, Ill.
- Parks-Cramer Co., Fitchburg, Mass.
- Peters-Dalton, Inc., Detroit, Mich.
- Phillips Cooling Tower Co., Inc., New York, N. Y.
- Ross Sprinkler Co., Pasadena, Calif.
- Schmieg Industries, Detroit, Mich.
- Spray Engineering Co., Somerville, Mass.
- Strandwitz & Co., Inc., W. J., Camden, N. J.
- Tenney Engineering, Inc., Newark, N. J.
- ● Trane Co., The, LaCrosse, Wis.
- Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
- ● United States Air Conditioning Corp., Minneapolis, Minn.
- ● Utility Appliance Corp., Los Angeles, Calif.
- Vilter Mfg. Co., Milwaukee, Wis.
- Western Blower Co., Seattle, Wash.
- Westinghouse Electric Corp., Pittsburgh, Pa.
- ● York Corp., York, Pa.

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WATER CHILLERS

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WATER DISTRIBUTORS FOR CONDENSERS

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WATER FILTERS

See Filters, Water

WATER HEATERS

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WATER METERS

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WATER SOFTENERS

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WATER TREATMENT

See Treatment, Water, to Inhibit Corrosion

WATER VAPOR REFRIGERATION

See Compressors, Refrigerating, Centrifugal; and Compressors, Refrigerating, Steam Jet

WELD TESTING MACHINES

See Machines, Testing, Weld

WELDERS, ARC

Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
● Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Borm Mfg. Co., Elgin, Ill.
Commonwealth Electric Welder Mfg. Co., Philadelphia, Pa.
Eisler Engineering Corp., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Ergolyte Mfg. Co., Philadelphia, Pa.
Fern, Ralph, Scranton, Pa.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hammett Electric Mfg. Co., Kansas City, Mo.
Hampton Electric Mfg. Co., Pittsburgh, Pa.
Harnischfeger Corp., Milwaukee, Wis.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Hobart Bros. Co., Troy, O.
Ideal Electric & Mfg. Co., Mansfield, O.
Kern Co., John A., Chicago, Ill.
Lee Co., K. O., Aberdeen, S. D.
Lincoln Electric Co., Cleveland, O.
Marquette Mfg. Co., Minneapolis, Minn.
Mid-States Equipment Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
National Cylinder Gas Co., Chicago, Ill.
Sight Feed Generator Co., Richmond, Ind.
Smith Corp., A. O., Milwaukee, Wis.
Smith Welding Equipment Corp., Minneapolis, Minn.
Trindl Products, Ltd., Chicago, Ill.
Tweco Products Co., Wichita, Kan. (Cable connectors, electrode holders and accessories)
Una Welding, Inc., Cleveland, O. (Automatic shielded arc welding)
Universal Power Corp., Cleveland, O.
Welding Apparatus Co., Chicago, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.
Will-Weld Mfg. Co., Inc., Omaha, Neb.
Wilson Welder & Metals Co., Inc., New York, N. Y.

WELDERS, SPOT

Acme Electric Welder Co., Los Angeles, Calif.
Agnew Electric Co., Milford, Mich.
Alphil Spot Welding Co., Brooklyn, N. Y.
Doall Co., The, DesPlaines, Ill.
Eisler Engineering Corp., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Federal Machine & Welder Co., The, Warren, O.
Fern, Ralph, Scranton, Pa.
Micro Products Co., Chicago, Ill.
Pier Equipment Mfg. Co., Benton Harbor, Mich.
Precision Welder & Machine Co., Cincinnati, O.
Rex Welder & Engineering Co., Kansas City, Mo.
Sciaky Bros., Inc., Chicago, Ill.
Taylor-Hall Welding Corp., Warren, O.
Taylor-Winfield Corp., Warren, O.
Thomson Electric Welder Co., Lynn, Mass.
Universal Power Corp., Cleveland, O.
Universal Welder Corp., Cleveland, O.
Weldex, Inc., Detroit, Mich.

WELDERS, STUD

Federal Machine & Welder Co., The, Warren, O.
Nelson Specialty Welding Equipment Corp., San Leandro, Calif.
Powder Power Tool Corp., Portland, Ore.

WELDING COMPOUNDS

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WELDING AND CUTTING APPARATUS, OXY-ACETYLENE

Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Atlas Welding Accessories Co., Detroit, Mich. (Weld cleaning tools)
Black Mfg. Co., The, Baltimore, Md.
Dockson Corp., Detroit, Mich.
Ergolyte Mfg. Co., Philadelphia, Pa.
Galv-Weld Products, Dayton, O. (Regalvanizing process)
General Scientific Equipment Co., Philadelphia, Pa.
Harris Calorific Co., The, Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Ransome Machinery Co., Sub. of Worthington Pump & Machinery Corp., Dunellen, N. J. (Welding positioner)
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Tru-Line Corp., Santa Monica, Calif. (Protractor for marking pipe)
Universal Power Corp., Cleveland, O.
Victor Equipment Co., San Francisco, Calif.
Wall Chemicals Div. of The Liquid Carbonic Corp., Chicago, Ill.

WELDING FUME COLLECTORS

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WELDING PIPE CLAMPS

See Clamps, Pipe, Welding

WELDING RINGS

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WELDING ROD

See Rod, Gas Welding

WHEELS, BLOWER

Advance Aluminum Castings Corp., Chicago, Ill.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Bayley Blower Co., Milwaukee, Wis.
● Bishop & Babcock Mfg. Co., Cleveland, O.
Brundage Co., The, Kalamazoo, Mich.
Burden Co., Los Angeles, Calif.
Champion Blower & Forge Co., Lancaster, Pa.
● Clarage Fan Co., Kalamazoo, Mich.
Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
● Hastings Air Conditioning Co., Hastings, Neb.
Jaden Mfg. Co., Hastings, Neb.
● Janette Mfg. Co., Chicago, Ill.
Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
Mayne Products Co., Dayton, O.
Morrison Products, Inc., Cleveland, O.
New York Blower Co., Chicago, Ill.
Peerless Electric Co., Warren, O.
Power Engineering Co., Chicago, Ill.
Revcor, not Inc., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Torrington Mfg. Co., Torrington, Conn.
Triangle Mfg. Co., Oshkosh, Wis.
● United States Air Conditioning Corp., Minneapolis, Minn.
● Utility Appliance Corp., Los Angeles, Calif.
Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Pittsburgh, Pa.

WHITE PRINT MACHINES

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WINDOW VENTILATOR AND FILTER UNITS

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WINDOWS, HEAT INSULATING

Andersen Corp., Bayport, Minn.
Chamberlin Co. of America, Detroit, Mich.
Detroit Steel Products Co., Detroit, Mich.
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Kane Mfg. Corp., Kane, Pa.
Libbey-Owens-Ford Glass Co., Toledo, O.
Mississippi Glass Co., New York, N. Y.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Russell Co., F. C., The, Cleveland, O.
Truscon Steel Co., Youngstown, O.

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WOOD PIPE

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WRENCHES, ADJUSTABLE

Billings & Spencer Co., Hartford, Conn.
● Bonney Forge & Tool Works, Allentown, Pa.
Crescent Tool Co., Jamestown, N. Y.
Erie Tool Works, Erie, Pa.
Peck, Stow & Wilcox Co., Southington, Conn.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
● Williams & Co., J. H., Buffalo, N. Y.

WRENCHES, OPEN END

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee, Wis.
● Bonney Forge & Tool Works, Allentown, Pa.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Tubing Appliance Co., Los Angeles, Calif.
● Williams & Co., J. H., Buffalo, N. Y.

WRENCHES, PIPE

Armstrong Bros. Tool Co., Chicago, Ill.
Bernz Co., Inc., Otto, Rochester, N. Y.
Billings & Spencer Co., Hartford, Conn.
● Bonney Forge & Tool Works, Allentown, Pa.
Erie Tool Works, Erie, Pa.
International Nutyp Tool Co., Oswego, N. Y.
Lowell Wrench Co., Worcester, Mass.
Peck, Stow & Wilcox Co., Southington, Conn.
● Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
USHCO Mfg. Co., Inc., Buffalo, N. Y.
● Walworth Co., New York, N. Y.

WRENCHES, RATCHET

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee, Wis.
● Bonney Forge & Tool Works, Allentown, Pa.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Greene, Tweed & Co., North Wales, Pa.
Lowell Wrench Co., Worcester, Mass.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
● Williams & Co., J. H., Buffalo, N. Y.

WRENCHES, SOCKET

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee, Wis.
● Bonney Forge & Tool Works, Allentown, Pa.
Chicago Pneumatic Tool Co., New York, N. Y. (pneumatic)
Lowell Wrench Co., Worcester, Mass.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Tubing Appliance Co., Los Angeles, Calif.
● Williams & Co., J. H., Buffalo, N. Y.

WRENCHES, TORQUE INDICATING

Ammco Tools, Inc., North Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
● Bonney Forge & Tool Works, Allentown, Pa.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
J. O. Mfg. Co., South Gate, Calif.
Richmont, Inc., Los Angeles, Calif.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-On Tools Corp., Kenosha, Wis.
Sturtevant Co., P. A., Addison, Ill.
● Williams & Co., J. H., Buffalo, N. Y.

WROUGHT IRON PIPE

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WROUGHT IRON SHEETS

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X-RAY MACHINES AND FILM

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DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 2—TRADE NAMES

A-B—Motor controllers. Allen-Bradley Co., Milwaukee, Wis.

A-C—Water treatment. Elgin Softener Corp., Elgin, Ill.

A/C Range—Filters. American Air Filter Co., Inc., Louisville, Ky.

ABC—Humidifiers, dust collectors, unit coolers. American Blower Corp., Detroit, Mich.

ACB—Coatings. Tropical Paint & Oil Co., Cleveland, O.

AGP—Heaters. American Radiator & Standard Sanitary Corp. Pittsburgh, Pa.

A-P—Damper operators, regulators, thermostats, valves. Automatic Products Co., Milwaukee, Wis.

A.P.S. Plasteel—Metal sheets. Plasteel Products Co., Washington, Pa.

A.R.A.—Non-metallic sheets and board. Wilson, Inc., Grant, Chicago, Ill.

ARRC—Couplings, fittings, flanges, unions. Union Metal Wks., Chelsea, Mass.

ASBO—Ventilators. American Steel Band Co., Heidelberg, Pa.

A & T Colloid—Boiler cleaning compounds. Agnew & Tomlinson, New York, N. Y.

Abrasoweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Acco-Lastic—Caulking compounds. Accurate Metal Weather Strip Co., Inc., New York, N. Y.

Ace—Dampers. Martens & Stormoen, Boston, Mass.

Ace—Fittings, pipe, pumps, tanks, valves. American Hard Rubber Co., New York, N. Y.

Ace—Welders. Pier Equipment Mfg. Co., Benton Harbor, Mich.

Ace-Saran—Pipe, tubing. American Hard Rubber Co., New York, N. Y.

Acotite—Enamels and lacquers. Acorn Refining Co., Cleveland, O.

Acousteel—Insulation. Celotex Corp., The, Chicago, Ill.

Acousti-Celotex—Insulation. Celotex Corp., The, Chicago, Ill.

Acoustilite—Insulation. Insulite Co., Minneapolis, Minn.

Acoustone—Insulation. United States Gypsum Co., Chicago, Ill.

Acratherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Actex—Heat exchangers. Wabash Mfg. Co., Chicago, Ill.

Adamant—Fire brick cement. Botfield Refractories Co., Philadelphia, Pa.

Adastic—Insulating cement. Botfield Refractories Co., Philadelphia, Pa.

Adjustiblade—Registers. Tuttle & Bailey, Inc., New Britain, Conn.

Adjust-O-Feeder—Feeders, pumps, steam system and water treatment. % Proportioneers, Inc. %, Providence, R. I.

Adjustor—Heating systems. The Kehm Corp., Chicago, Ill.

Adsco—Coils, coolers, exchangers, heaters, joints, meters, pipe, pipe hangers and supports, pipe protectors, separators, sight glasses, strainers, regulators, valves. American District Steam Co., North Tonawanda, N. Y.

Adsco-Bannon—Conduit. American District Steam Co., North Tonawanda, N. Y.

Adsco Rotary—Condensation meters. American District Steam Co., North Tonawanda, N. Y.

Adsco Dual—Traps. American District Steam Co., North Tonawanda, N. Y.

Aemco—Relays, switches. Automatic Electric Mfg. Co., Mankato, Minn.

Aeracool—Blades, fans, louvers and shutters, ventilators. Myers Electric Co., Inc., Pittsburgh, Pa.

Aerisweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Aero—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Aero—Radiation, convector enclosures. National Radiator Co., The, Johnstown, Pa.

Aerodyne—Fans. Jeffrey Mfg. Co., Columbus, O.

Aerofuse—Air diffusers. Tuttle & Bailey, Inc., New Britain, Conn.

Aeronel—Ventilators. American Blower Corp., Detroit, Mich.

Aeroplane—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Aeroplex—Fans. Bayley Blower Co., Milwaukee, Wis.

Aeropull—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.

Aero Seal—Packing. Chicago Belting Co., Chicago, Ill.

Aerospot—Fans. South Bend Air Products, Inc., South Bend, Ind.

Aerotec—Cleaners, collectors, separators, switches, valves. Thermix Corp., The, Greenwich, Conn.

Aerovane—Grilles, registers. Tuttle & Bailey, Inc., New Britain, Conn.

Afco—Fans, furnaces, heaters. American Furnace Co., St. Louis, Mo.

Affco—Louvers and shutters. American Foundry & Furnace Co., Bloomington, Ill.

Agastat—Time switches, electrical relays. American Gas Accumulator Co., Elizabeth, N. J.

Agile—Welding electrodes. American Agile Corp., Cleveland, O.

Agitair—Air diffusers, filters, grilles, heaters, vanes, ventilators. Air Devices, Inc., New York, N. Y.

Air Control—Fans, heaters, unit air conditioners. Hastings Air Conditioning Co., Hastings, Neb.

Air Flow—Fans. Goettl Bros. Metal Prod. Co., Phoenix, Ariz.

Air Guide Volume Controller—Vanes. Titus Mfg. Corp., Waterloo, Ia.

Air Lock—Burners. Reinhard Brothers Co., Minneapolis, Minn.

Air Meter—Meters. Hastings Instrument Co., Hampton, Va.

Air-Van—Ventilators. The Gallaher Co., Owatonna, Minn.

Air Vane—Grilles, registers. Rock Island Register Co., Rock Island, Ill.

Airacoustic—Insulation. Johns-Manville, New York, N. Y.

Airate—Ventilators. Dickinson, Aeolus, Chicago, Ill.

Air-Champ—Air conditioning units, air washers. Alton Mfg. Co., Dallas, Tex.

Airco—Welding rod, solder, pipe cutting machines. Air Reduction Sales Co., New York, N. Y.

Aircor—Filters. Air Filter Corp., Milwaukee, Wis.

Air-Con—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Airdfin—Heat exchangers. J. F. Pritchard & Co., Kansas City, Mo.

Airefiner—Water treatment. Oakite Products, Inc., New York, N. Y.

Airex—Air washers, fans, unit air conditioners, ventilators. Mountain States Equipment Co., Denver, Colo.

Air-Fan—Window ventilator units. Reliable Sheet Metal Engineering Co., Chicago, Ill.

Air-flo—Dampers, louvers and shutters. Air Conditioning Products Co., Detroit, Mich.

Air-flo—Ventilators. Dickinson, Aeolus, Chicago, Ill.

Airfoil—Fans, fan blades, ventilators. Aerovent Fan Co., Piqua, O.

Airguide—Hygrometers, thermometers. Fee and Stemwedel, Inc., Chicago, Ill.

Airheater—Unit heaters. Airtherm Mfg. Co., St. Louis, Mo.

Airid—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Airidge—Ventilators. Dickinson, Aeolus, Chicago, Ill.

Airistocrat—Fan blades. Torrington Mfg. Co., Torrington, Conn.

Airjector—Ventilators. Swartwout Co., Cleveland, O.

Airiet—Ventilators, C. R. Gelert Co., Pasadena, Calif.

Airline—Grilles, registers. Tuttle & Bailey, Inc., New Britain, Conn.

Airmat Arrester—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.

Airmixt—Gas and oil burners. Williams, Inc., F. C., Dearborn, Mich.

Airmover—Ventilators. Swartwout Co., Cleveland, O.

Airo-Flex—Registers. Auer Register Co., Cleveland, O.

Airocool—Burners. National Airoil Burner Co., Inc., Philadelphia, Pa.

Airoil—Oil burners. National Airoil Burner Co., Inc., Philadelphia, Pa.

Air-o-Line—Indicator-controllers, recorder-controllers. Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.

Air-O-Line—Pumps, valves. Beckett & Co., Inc., Thomas, Dallas, Tex.

Air-O-Matic—Refrigerating machines, air conditioning units. Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.

Airotherm—Zone control thermostat. Tallmadge & Co., Webster, East Orange, N. J.

Airotor—Blower wheels. Torrington Mfg. Co., Torrington, Conn.

Airout—Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.

Airovent—Gas Burners. National Airoil Burner Co., Inc., Philadelphia, Pa.

Airstat — Regulators. Minneapolis - Honeywell Regulator Co., Minneapolis, Minn.

Airstream—Air filters. Brauer Supply Co., A. G., St. Louis, Mo.

Airstream—Blower wheels, fans. Morrison Products, Inc., Cleveland, O.

Airswitch—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Air-Tumbler—Dust collectors. Dust Suppression & Engineering Co., Lake Orion, Mich.

Airturn—Duct turning vanes. Barber-Colman Co., Rockford, Ill.

Airvalve—Ventilators. Swartwout Co., Cleveland, O.

Air-Wave—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.

Ajax—Gaskets. United States Gasket Co., Camden, N. J.

Akon—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Aktiv—Cleaning compounds. Turco Products, Inc., Los Angeles, Calif.

Alcalex—Water softeners. Research Products Corp., Madison, Wis.

Alco—Ventilators. Lumm Co., A. H., Toledo, O.

Alcoa — Angles, dehydrators, electrodes, exchangers, pipe, sheets, tanks, tubing. Aluminum Co. of America, Pittsburgh, Pa.

Alkacite—Protective coatings. Protective Coatings, Inc., Detroit, Mich.

Allen—Fans, air conditioning units, ventilators. Production Planning Co., Rochester, Mich.

All-In-One—Regulators. Bell & Gossett Co., Morton Grove, Ill.

Allspeed Selector—Mechanical changers. Worthington Pump & Machinery Corp., Harrison, N. J.

Alnor—Anemometers, dewpoint instrument, indicator controllers, thermometers. Illinois Testing Laboratories, Chicago, Ill.

Aloyco—Stainless steel fittings, nipples, pipe, tubing, unions, valves. Alloy Steel Products Co., Linden, N. J.

Alternarc—Arc welders. Electric Arc, Inc., Newark, N. J.

Alumaweld—Solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.

Aluminweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Always Reliable—Benders, cutters, leak detectors, torches, wrenches. Bernz Co., Inc., Otto, Rochester, N. Y.

Amblerex—Insulating cement. Keasbey & Mattison Co., Ambler, Pa.

Amco—Galvanizing powder. American Solder & Flux Co., Philadelphia, Pa.

Amco—Humidifiers. Grinnell Co., Inc., Providence, R. I.

Amco—Air conditioning units, humidifiers, humidistats, hygrometers. American Moistening Co., Providence, R. I.

Amco—Gaskets, packing. Austin-Mason Co., New York, N. Y.

Amcoil—Condensers, radiation, cooling and heating surfaces, air conditioning units. American Coils Co., Newark, N. J.

American—Absorbers, metal hose. American Metal Hose Branch, American Brass Co., The, Waterbury, Conn.

American—Couplings. American Flexible Coupling Co., Erie, Pa.

American—Furnaces, heaters. American Foundry & Furnace Co., Bloomington, Ill.

American—Gages, recorders, regulators, thermometers, valves. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.

American—Meters. American Meter Co., Inc., New York, N. Y.

American—Speed reducers. American Pulley Co., Philadelphia, Pa.

American—Vibration eliminators. American Metal Hose Branch, American Brass Co., Waterbury, Conn.

American—Pumps, softeners, water filters, water treatment. American Well Works, Aurora, Ill.

American—Pipe benders. American Pipe Bending Machine Co., Inc., Poultney, Vt.

American — Convector enclosures, radiation— American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

American Empire—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

American Exbrook—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

American Redflash—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Standard—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Water Tube—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh Pa.
Amerigear—Couplings. American Flexible Coupling Co., Erie, Pa.
Ameritherm—Heaters, air conditioning units. American Thermal Industries, Detroit, Mich.
Ames—Pumps. Domestic Engine & Pump Co., Shippensburg, Pa.
Amesteam—Boilers. Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Aminco—Valves. American Injector Co., Detroit, Mich.
Aminco Climatizer—Test chambers. American Instrument Co., Silver Spring, Md.
Ampac—Arc welders. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Am-Pe-Co—Centrifugal fans. American Machine Products Co., Marshalltown, Ia.
Amtico—Heaters, air conditioning units. American Thermal Industries, Detroit, Mich.
Anaconda—Fittings, pipe, welding rod, sheets, solder, tubing, valves. American Brass Co., Waterbury, Conn.
Anchorjoint—Joints. Magnalastic Div., Cook Electric Co., Chicago, Ill.
Anemo-light—Air diffusers. Anemostat Corp. of America, New York, N. Y.
Ankorite—Packing. Anchor Packing Co., Philadelphia, Pa.
Anthracite 1600—Water heaters. Catskill Metal Works, Inc., Catskill, N. Y.
Anti-Sweat—Insulation. Johns-Manville, New York, N. Y.
A-Pe-Co—Blueprint machines. American Photocopy Equipment Co., Chicago, Ill.
Apex—Analyzers, recorders. Uehling Instrument Co., Paterson, N. J.
Apex—Regulators, dampers. Ohio Products Co., Cleveland, O.
Apexior—Coatings. Dampney Co. of America, Boston, Mass.
Aqua-Clear—Water treatment. Sudbury Laboratory, South Sudbury, Mass.
AquaHeater—Heaters. Lewis & Co., Joseph E., Baltimore, Md.
Aqualator—Circulators. Triplex Mfg. Co., Inc., Peru, Ind.
Aqua-Master—Water heaters. Century Engineering Corp., Cedar Rapids, Ia.
Aquamizer—Condensers. Westinghouse Electric Corp., Pittsburgh, Pa.
Aqua-Tite—Seals. Schwitzer-Cummins Co., Indianapolis, Ind.
Aquatone—Treatment, steam and water. Ampion Corp., Long Island City, N. Y.
Aquatrol—Boiler cleaning compounds and water treatment. Aquatic Chemical Laboratories, Inc., New York, N. Y.
Aqulux—Heaters. Johnson Co., S. T., Philadelphia, Pa.
Arc-Eng—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Arc-Heat—Burners. American Heat Corp., Boston, Mass.
Arco—Hangers, radiation, regulators, valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Arctic Circle—Air conditioning units. Goettl Bros. Metal Prod. Co., Phoenix, Ariz.
Arex-Austor—Roof ventilators. Arex Co., Chicago, Ill.
Aridifier—Separators. Logan Engineering Co., Chicago, Ill.
Arin—Louvers and shutters. Arex Co., Chicago, Ill.
Armco—Sheets. American Rolling Mill Co., The, Middletown, O.
Armorak—Insulation. Keasbey Co., Robert A., New York, N. Y.
Arrowtrol—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Art—Direct radiation. The National Radiator Co., Johnstown, Pa.
Artic—Refrigerants. du Pont de Nemours & Co., E. I., Electrochemicals Dept., Wilmington, Del.
Asbestocel—Insulation. Johns-Manville, New York, N. Y.
Asco—Valves, relays, switches. Automatic Switch Co., Orange, N. J.
Ashcroft—Gages. Manning Maxwell & Moore, Inc., Bridgeport, Conn.
At-a-Glance—Gages. Krueger Sentry Gauge Co., Green Bay, Wis.
Athol—Pipe fittings, unions. Leavitt Machine Co., Orange, Mass.
Atlas—Fans, furnaces, heaters. International Sales Co., San Francisco, Calif.
Atomick—Humidifiers, nozzles. Maid-'O-Mist, Inc., Chicago, Ill.
Atomist—Humidifiers. American Foundry & Furnace Co., Bloomington, Ill.
Atticvane—Fans. Westinghouse Electric Corp., Pittsburgh, Pa.
Auditone—Insulation. United States Gypsum Co., Chicago, Ill.
Aujax—Pipe benders. Electric Cord Co., New York, N. Y.
Auto-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.
Autolite—Gages, gage glasses, recorders, thermometers. Electric Autolite Co., Instrument & Gauge Div., Toledo, O.
Automatic Heat—Heaters. Heat Equipment not Inc., Chicago, Ill.
Auto-Tite—Pipe couplings. Superior Railway Products Corp., Pittsburgh, Pa.
Autovent—Eliminators, humidifiers, valves. Maid-O'-Mist, Inc., Chicago, Ill.
Autozone—Zone control unit. Tallmadge & Co., Webster, East Orange, N. J.
Axiaflo—Propeller pumps. Ruthman Machinery Co., Cincinnati, O.
Axiflo—Propeller fans. Westinghouse Electric Corp., Pittsburgh, Pa.
Axiom—Filters. Blocksom & Co., Michigan City, Ind.
Axivane—Fans. Joy Mfg. Co., Pittsburgh, Pa.

B.A.C.—Condensers. Baltimore Aircoil Co., Inc., Baltimore, Md.
B. B.—Blast gates. Berger Bros. Co., Philadelphia, Pa.
B. B.—Electric motors. Brown-Brockmeyer Co., Dayton, O.
B & B—Heating and air conditioning equipment. Bishop & Babcock Mfg. Co., Cleveland, O.
BCA—Bearings. Bearings Co. of America, Lancaster, Pa.
B & C—Plates. Beaton & Corbin Mfg. Co., Southington, Conn.
B. & G.—Air eliminators, circulators, coolers, condensers, fittings, hangers, heat exchangers, heaters, regulators, tanks, thermostats, valves. Bell & Gossett Co., Morton Grove, Ill.
B-H—Insulation. Baldwin-Hill Co., Trenton, N. J.
B-H No. 1—Insulating cement. Baldwin-Hill Co., Trenton, N. J.
B-H No. 100—Pipe insulation. Baldwin-Hill Co., Trenton, N. J.
B & K—Pipe cutting and threading machines. Bignall & Keeler Machine Works, Edwardsville, Ill.
B & W—Boilers, burners, desuperheaters, fuel economizers, heat exchangers, insulating cement, refractories, stokers, superheaters, valves. Babcock & Wilcox Co., New York, N. Y.
B & W—Pipe and tubing. Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
B & W—Tubing. Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bacite—Insulation. Bird-Archer Co., Philadelphia, Pa.
Baco—Cleaning compounds, refractories. Bird-Archer Co., Philadelphia, Pa.
Badger—Time switches. Reliance Automatic Lighting Co., Racine, Wis.
Baflex—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Balancer—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Baldwin-Rex—Couplings, chain drives. Chain Belt Co., Milwaukee, Wis.
Balsam-Wool—Insulation. Wood Conversion Co., St. Paul, Minn.
Bankheat—Oil burners. Johnson Co., S. T., Philadelphia, Pa.
Barcol—Humidistats, motors, operators, regulators, thermostats, valves. Barber-Colman Co., Rockford, Ill.
Barnes—Cutters. Erie Tool Works, Erie, Pa.
Barreled Sunlight—Enamels. U.S. Gutta Percha Paint Co., Providence, R. I.
Barry—Bearings, pulleys and sheaves. Dick Co., Inc., R. & J., Passaic, N. J.
Bar-Stock—Valves. Reading Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Barton-American — Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Base Ray—Baseboard radiation. Burnham Corp., Boiler Div., Irvington, N. Y.
Basifrit—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Basmor—Boilers. Bastian-Morley Co., Inc., La Porte, Ind.
Battery—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Beacor—Valves. Beaton & Corbin Mfg. Co., Southington, Conn.
Beauticast—Radiation. Columbia Radiator Co., McKeesport, Pa.
Beaverkill—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Belco—Fans, louvers and shutters. Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Bellowseal—Gaskets. Goetze Branch, Johns-Manville, New York, N. Y.
Benco—Oil burners. Bennett Co., Omaha, Neb.
Benda Vane—Grilles. Rock Island Register Co., Rock Island, Ill.
Bend-Ezy—Grilles, registers. Standard Stamping & Perforating Co., Chicago, Ill.
Bendmaster—Tubing benders. Leonard Precision Products Co., Garden Grove, Calif.
Bestfelt—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Beth-Co-Weld—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Beth-Cu-Loy—Sheets. Bethlehem Steel Co., Bethlehem, Pa.
Bi-Air—Burners. John Zink Co., Tulsa, Okla.
Bifurcator—Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Bildrite—Insulation. Insulite Co., Minneapolis, Minn.
Bi-Mix—Burners. John Zink Co., Tulsa, Okla.
Binoc—Thermometers. Taylor Instrument Companies, Rochester, N. Y.
Bison—Boilers. Farrar & Trefts, Buffalo, N. Y.
Bitumastic—Protective coatings. Koppers Co., Inc., Tar Products Div., Pittsburgh, Pa.
Bituminous—Coatings. Robertson Co., H. H., Pittsburgh, Pa.
Bituplastic—Coatings. Koppers Co., Inc., Tar Products Div., Pittsburgh, Pa.
Black Baking Japans—Enamels and lacquers. Hilo Varnish Co., Brooklyn, N. Y.
Black Magic—Welding compounds. Universal Power Corp., Cleveland, O.
Black Magic—Cement and compounds. Bowser, Inc., Fort Wayne, Ind.
Bloapco—Dust collectors. Blower Application Co., Milwaukee, Wis.
Blo-Cold—Unit coolers. Acme Industries, Inc., Jackson, Mich.
Bloflex—Hose. American Ventilating Hose Co., New York, N. Y.
Blowertrol—Speed changers. White Mfg. Co., St. Paul, Minn.
Blu-Cold—Compressors. Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Blueknight—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Blue-Point—Tools, wrenches. Snap-On Tools Corp., Kenosha, Wis.
Blue Ribbon—Headers and nipples. Chicago Nipple Mfg. Co., Cicero, Ill.
Blue Streak—Blueprint machines. Paragon-Revolute Corp., Rochester, N. Y.
Boardman—Pump governors. Locke Regulator Co., Salem, Mass.
Boiler Solder Seal—Compounds. Radiator Specialty Co., Charlotte, N. Carolina.
Boylout—Cleaning compounds. Apex Engineering Co., Chicago, Ill.
Branford—Oil burners, unions. Malleable Iron Fittings Co., Branford, Conn.
Brassweld—Compounds. Sight Feed Generator Co., Richmond, Ind.
Brazarc—Electrodes. Universal Power Corp., Cleveland, O.
Brazo—Solder. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
BRI Gun—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Breeze Spreader—Propeller fans. Victor Electric Products, Inc., Cincinnati, O.
Breezo—Fans. Buffalo Forge Co., Buffalo, N. Y.
Bro-For—Boiler compounds. Brown-Ford Corp., Newton, Mass.
Bronzende—Electrodes. Arcos Corp., Philadelphia, Pa.
Bronzeweld—Compounds. Sight Feed Generator Co., Richmond, Ind.
Brommell—Eliminators, floats, heating systems, traps, valves. Vapor Specialty Co., New York, N. Y.
Brommweld—Finned tubing. Brown Fintube Co., The, Elyria, O.
BTUnit—Unit heaters. Industrial Mfg. & Engineering Co., Chicago, Ill.
Budget—Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bulator—Grilles. Hendrick Mfg. Co., Carbondale, Pa.
Bulldog—Shears and snips. Wiss & Sons Co., J., Newark, N. J.
Bull Dog—Stocks and dies. Oster Mfg. Co., Cleveland, O.
Bull Dog—Pipe and tubing. Phelps Dodge Copper Products, British American Tube Div., New York, N. Y.
Bundyflex—Steel tubing. Everhot Products Co., Chicago, Ill.
Bundyweld—Tubes and tubing. Bundy Tubing Co., Detroit, Mich.
Bunker Hill—Fittings, pipe, sheets, solder. Northwest Lead Co., Seattle, Wash.
Burks—Pumps. Decatur Pump Co., Decatur, Ill.
Burnham—Compressors, condensers, pumps. Union Steam Pump Co., Battle Creek, Mich.

C-E—Boilers, burners, stokers. Combustion Engineering Co., New York, N. Y.
C-H—Controllers and starters, heaters, relays, regulators, switches, valves. Cutler-Hammer, Inc., Milwaukee, Wis.
CIB—Bearings. Ahlberg Bearing Co., Chicago, Ill.
C & M—Hangers or brackets. Carty & Moore Engineering Co., Detroit, Mich.
C & R—Regulators. Automatic Control Co., St. Paul, Minn.
CMH—Bellows, pipe joints. Chicago Metal Hose Corp., Maywood, Ill.
COM—Blowers. Wing Mfg. Co., L. J., New York, N. Y.
CW—Pipe. Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Cadillac—Meters. Central Station Steam Co., Detroit, Mich.
Cadman—Valves. Barrett Machine Co., N. S., Pittsburgh, Pa.
Cadwell—Pressure regulators, valves. Beaton & Cadwell Mfg. Co., New Britain, Conn.
Calco—Valves. California Brass Mfg. Co., Los Angeles, Calif.
Calk-N-Seal—Caulking compounds. Blue Ridge Talc Co., Henry, Va.
Calktite—Cement and compounds. U. S. Stoneware Co., New York, N. Y.

Cantilever—Hygrometers. Standard Thermometer, Inc., Boston, Mass.
Capacilogs—Temperature recorders. Wheelco Instruments Co., Chicago, Ill.
Capacitrols—Indicator-controllers. Wheelco Instruments Co., Chicago, Ill.
Capillary—Air washers. American Blower Corp., Detroit, Mich.
Capillary—Air washers. Clarage Fan Co., Kalamazoo, Mich.
Capillary—Air washers, dehumidifiers, humidifiers, unit air conditioners. Air & Refrigeration Corp., New York, N. Y.
Capitol—Insulation. Standard Lime & Stone Co., Baltimore, Md.
Carbolite—Soot destroyers. Ampion Corp., Long Island City, N. Y.
Carend—Electrodes. Arcos Corp., Philadelphia, Pa.
Careyduct—Ducts and duct fittings, insulation, non-metallic sheets, duct turning vanes. Carey Mfg. Co., Philip, Cincinnati, O.
Carstenite—Insulators. Technical Plywoods, Chicago, Ill.
Cash-Acme—Heating systems, pipe strainers, regulators, valves. Cash Valve Mfg. Co., A. W., Decatur, Ill.
Castalu—Fans, wheels. Advance Aluminum Castings Corp., Chicago, Ill.
Castirnarc—Electrodes. Universal Power Corp., Cleveland, O.
Cast-Refract—Resfractories. Quigley Co., Inc., New York, N. Y.
Catch-All—Dehydrators. Sporlan Valve Co., St. Louis, Mo.
Causul—Valves. Lunkenheimer Co., Cincinnati, O.
Cell-U-Blanket—Insulation. Masonite Corp., Chicago, Ill.
Cellufoam—Insulation. Masonite Corp., Chicago, Ill.
Celeron—Couplings, fittings. Continental Diamond Fibre Co., Newark, Del.
Celo-Siding—Insulation. Celotex Corp., The, Chicago, Ill.
Cemcoat—Enamels and lacquers. Sonneborn Sons, Inc., New York, N. Y.
Cementseal—Enamels and lacquers. Acorn Refining Co., Cleveland, O.
Cemesto—Insulation. Celotex Corp., The, Chicago, Ill.
Central—Conduit. Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Centrimax—Meters. Leeds & Northrup Co., Philadelphia, Pa.
Centripac—Packing. Johns-Manville, New York, N. Y.
Centripeller—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.
Chaco—Cement and compounds, boiler and radiator sealing compounds. Desolvo Co., The, Pittsburgh, Pa.
Challenger—Stokers. Link-Belt Co., Chicago, Ill.
Champion—Furnaces, heaters. National Heater Co., St. Paul, Minn.
Champion—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Chem-o-Feeder. Feeders, pumps, steam system and water treatment. % Proportioneers, Inc., % Providence, R. I.
Chernack—Non-metallic ducts. Wiremold Co., The, Hartford, Conn.
Chevron—Packing. Garlock Packing Co., Palmyra, N. Y.
Chicago—Brakes. Dreis & Krump Mfg. Co., Chicago, Ill.
Chicago—Stokers. Eddy Stoker Corp., Chicago, Ill.
Chicago-Wrigley—Bolts. Chicago Expansion Bolt Co., Chicago, Ill.
Chico Brikset—Cement. Chicago Fire Brick Co., Chicago, Ill.
Chieftain—Compressors. Tecumseh Products Co., Tecumseh, Mich.
Chill-Vactor—Chillers and steam jet compressors. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Chimney Sweep—Chemical destroyers. Coughlan Co., G. N., West Orange, N. J.
Chinook—Ferrous heating surface. Bayley Blower Co., Milwaukee, Wis.
Chinookfin—Non-ferrous heating surface. Bayley Blower Co., Milwaukee, Wis.
Chlorend B—Electrodes. Arcos Corp., Philadelphia, Pa.
Chore Boy—Burners. Standard Fuel & Engineering Co., Detroit, Mich.
Chromalox—Preheaters, unit heaters. Wiegand Co., Edwin L., Pittsburgh, Pa.
Chrome Lock—Gaskets. Products Research Co., Los Angeles, Calif.
Chromend—Electrodes. Arcos Corp., Philadelphia, Pa.
Chromang—Electrodes. Arcos Corp., Philadelphia, Pa.
Chromeweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Chromix—Refractories. Quigley Co., Inc., New York, N. Y.
Chronoflo—Flow meters, recorders. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Chronometer—Valves. Defender Instrument & Regulator Co., St. Louis, Mo.
Chronotherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Cinch—Expansion bolts. National Lead Co., New York, N. Y.
Circle T—Switches. Trumbull Electric Co., The, Plainville, Conn.
Circo—Louvres and shutters, fan housings. Circulators & Devices Mfg. Co., New York, N. Y.
Clamp-A-Leak—Pipe repair clamps. Chelsea Metal Stamping Co., New York, N. Y.
Clarco—Unit heaters. Clarage Fan Co., Kalamazoo, Mich.
Classic—Registers. Auer Register Co., Cleveland, O.
Cle-Bar—Heaters. Cleghorn Co., Boston, Mass.
Clevita—Bearings. Cleveland Graphite Bronze Co., Cleveland, O.
Cliff—Boilers, water heaters. Terre Haute Boiler Works Co., Terre Haute, Ind.
Climate Changer—Unit air conditioners, unit air coolers. Trane Co., The, La Crosse, Wis.
Climatrol—Boilers, furnaces, heaters, metallic ducts, registers. Mueller Furnace Co., L. J., Milwaukee, Wis.
Clipper—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Closin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Cocheo—Belting. Williams & Son, I. B., Dover, N. H.
Colalloy—Couplings, fittings, flanges, nipples, pipe. Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Cold Stream—Unit air conditioners. Baker Ice Machine Co., Inc., South Windham, Me.
Coltemp—Insulation. Badham Insulation Co., Inc., Birmingham, Ala.
Columbia—Odor adsorbers. Carbide and Carbon Chemicals Corp., New York, N. Y.
Columbia—Ventilators. E. E. Souther Iron Co., St. Louis, Mo.
Combustioneer—Stokers. Steel Products Engineering Co., Springfield, O.
Comet—Fans, unit heaters. New York Blower Co., Chicago, Ill.
Comfort-Air—Air washers. Comfort Products Corp., Dallas, Tex.
Comfort Panel—Radiation. Columbus Radiator Co., McKeesport, Pa.
Comfortrol—Switches. Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Comfostat—Thermostats. Johnson Service Co., Milwaukee, Wis.
Co-Min-Co—Insulating cement. United States Mineral Wool Co., South Milwaukee, Wis.
Compact-Boilers. Titusville Iron Works Co., The, Titusville, Pa.
Compass—Belting. Goodyear Tire & Rubber Co., Akron, O.
Conco—Boiler cleaning compounds, water treatment. Continental Products Co., Euclid, O.
Condor—Belting, V belts, pipe. Raybestos-Manhattan, Inc., Passaic, N. J.
Condo-Vac—Vacuum pumps. Chicago Pump Co., Chicago, Ill.
Congress—Switches. Congress Fan & Electric Co., Daytona Beach, Fla.
Coni-Vane—Ventilators. Production Planning Co., Rochester, Mich.
Consolidated—Valves. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Con-Tac-Tor—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Control-O-Gas—Valves. Payne Furnace Co., Beverly Hills, Calif.
Convect-O-Base—Baseboard radiation. Minimite Co., Chicago, Ill.
Convect-O-Fin—Fin tube radiation, tubing. Minimite Co., Chicago, Ill.
Convector—Humidifiers. Maid-O'-Mist., Inc., Chicago, Ill.
Conveyor—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.
Coolair—Fans. American Coolair Corp., Jacksonville, Fla.
Cooleraire—Air conditioning units. Payne Furnace Co., Beverly Hills, Calif.
Coolero—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Coolite—Windows. Mississippi Glass Co., New York, N. Y.
Coolmaster—Unit coolers. Kramer Trenton Co., Trenton, N. J.
Copaltite—Cement and compounds, gaskets. National Engineering Products, Inc., Washington, D. C.
Copes—Governors, regulators, steam desuperheaters, valves, water alarms. Northern Equipment Co., Erie, Pa.
Cop-R-Loy—Sheets. Wheeling Steel Corp., Wheeling, W. Va.
Copr-Tube—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Coravol—Corrosion treatment. Western Chemical Co., Kansas City, Mo.
Corkhoustic—Insulation. Armstrong Cork Co., Lancaster, Pa.
Cornelius—Air compressors and regulators. North Penn Co., New York, N. Y.
Corrodicide—Water treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Corrodine—Corrosion inhibition. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Cotoid—Coatings. Lithgow Corp., Chicago, Ill.
Cottrell—Dust collectors. Research Corp., New York, N. Y.
Cottrell—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.
Co-Z-Air—Radiation. Morton Associates, Inc., Henry J., Detroit, Mich.
Crescent—Boiler gage cocks, Wright-Austin Co., Detroit, Mich.
Crescent—Burner. Caloroil Burner Corp., Hartford, Conn.
Crescent—Unions. Star Mfg. Co., Inc., Providence, R. I.
Crescent—Valves. Powell Co., Wm., Cincinnati, O.
Croloy—Pipe. Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Cromaloy—Solder. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Cross-Flo—Dehydrators. Remco, Inc., Zelienople, Pa.
Crown—Cement and compounds. Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Crystals—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Cushiontone—Insulation. Armstrong Cork Co., Lancaster, Pa.
Custom-Air—Air conditioning units. Trane Co., The, LaCrosse, Wis.
Cut Master—Vertical turret lathes. Bullard Co., The, Bridgeport, Conn.
Cutno—Packing. Greene, Tweed & Co., North Wales, Pa.
Cycloidal—Air washers. Blower Application Co., Milwaukee, Wis.
Cycoil—Filters. American Air Filter Co., Louisville, Ky.
Cyclone—Exhaust heads. Wright Austin Co., Detroit, Mich.
Cyclops—Roller bearings. Roller Bearing Co. of America, Trenton, N. J.
Cyclotherm—Boilers. General Furnaces Corp., Oswego, N. Y.

DFN—Dehydrators, filters. McIntire Connector Co., Newark, N. J.
DH—Ball bearings. Dodge Mfg. Corp., Mishawaka, Ind.
D & H—Evaporative condensers, cooling and heating surfaces, unit air conditioners. Drayer & Hanson, Inc., Los Angeles, Calif.
D.I.P.—Insulation, piping. Durant Insulated Pipe Co., Palo Alto, Calif.
DV—Speed changers, v-belt drives. Dodge Mfg. Corp., Mishawaka, Ind.
Damit—Caulking compounds. Quigley Co., Inc., New York, N. Y.
Daptoblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Dart—Unions. Fairbanks Co., New York, N. Y.
Day-Nite Acratherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Day-Steel—Pulleys. Dayton Rubber Co., Dayton, O.
Dean—Cleaners. Pierce Co., Wm. B., The, Buffalo, N. Y.
Debecote—Coatings. Debevoise Co., The, Brooklyn, N. Y.
Deflecto-Grilles—Grilles. United States Air Conditioning Corp., Minneapolis, Minn.
Demandtrol—Valves. Sullivan Valve & Engineering Co., Butte, Mont.
Demon Air-Set—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.
Dereka—Protective coatings. Debevoise Co., The, Brooklyn, N. Y.
Desmond-Simplex—Pipe vises. Desmond-Stephan Mfg. Co., Urbana, O.
De-Sta-Co.—Fan housings, pipe clamps, valves. Detroit Stamping Co., Detroit, Mich.
Detroit—Traps. Nason Co., Detroit, Mich.
Detroit LoStoker—Stokers. Detroit Stoker Co., Detroit, Mich.
Detroit Unistoker—Stokers. Detroit Stoker Co., Detroit, Mich.
Dexter—Valve reseaters. Leavitt Machine Co., Orange, Mass.
Di-Acro—Benders, brakes, shears. O'Neil Irwin Mfg. Co., Lake City, Minn.
Dialon—Radiator valves, Bridgeport Brass Co., Bridgeport, Conn.
Diamond—Compounds, enamels and lacquers. Thompson & Co., Oakmont, Pa.
Diamond Fibre—Gaskets. Continental Diamond Fibre Co., Newark, Del.
Diamond H—Switches, thermostats. Hart Mfg. Co., Hartford, Conn.
Diaphlex—Controls. Cook Electric Co., Diaphlex Div., Chicago, Ill.
Dickbelt—Belting and drives. Dick Co., Inc., R. & J., Passaic, N. J.
Dickinson Ferrocast—Exhaust heads, ventilators. Dickinson, Aeolus, Chicago, Ill.
Dickrope—V belts and drives. Dick Co., Inc., R. & J., Passaic, N. J.
Dickvalve—Valves. Dick Co., Inc., R. & J., Passaic, N. J.
Dieselite—Corrosion prevention. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Difr-enshal-Vacm—Heating systems. Dunham Co., C. A., Chicago, Ill.
Dike—Furnace cement. Klee Co., Geo. B., Cincinnati, O.
Dilecto—Plastic pipe. Continental Diamond Fibre Co., Newark, Del.
Direct—Pipe fittings and flanges, separators, strainers. Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.
Directaire—Heaters. Fitzgibbons Boiler Co., Inc., New York, N. Y.
Discfin—Cooling surface. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Disc-Loc—Registers. Knowles Mushroom Ventilator Co., Montclair, N. J.

Disseminator—Compounds. Ampion Corp., Long Island City, N. Y.
Distributor—Radiation. Kehm Corp., The, Chicago, Ill.
Dixigas—Gas welding rod. Atlantic Steel Co., Atlanta, Ga.
Do-All—Combination hammer and drill. Wodack Electric Tool Corp., Chicago, Ill.
Dominion—Gaskets, packing. Darcoid Co., Inc., New York, N. Y.
Dorex—Adsorbers. W. B. Connor Engineering Corp., New York, N. Y.
Double Check—Boiler compounds. Hampton-Cross Co., The, Louisville, Ky.
Double Diamond—Hygrometers, recorders, psychrometers. H-B Instrument Co., Philadelphia, Pa.
Double-Seal—Copper tube fittings. Hays Mfg. Co., Erie, Pa.
Double U—Packing. Wayne Davies & Co., Westboro, Mass.
Dowmetal—Sheets, structural shapes, tubing, welding rod. Dow Chemical Co., Midland, Mich.
Downblast—Unit heaters. Westinghouse Electric Corp., Pittsburgh, Pa.
Down Flow—Unit heaters. McQuay, Inc., Minneapolis, Minn.
Dowtherm—Process heating systems. Dow Chemical Co., The, Midland, Mich.
Draft-A-Justor—Draft controls. Preferred Utilities Mfg. Corp., New York, N. Y.
Draft-O-Stat—Barometric controls. Hotstream Heater Co., Cleveland, O.
Draftrite—Gages. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Draftrite—Gages. Cole-Sewell Engineering Co., St. Paul, Minn.
Drainator—Traps. Coe Mfg. Co., Painesville, O.
Drain-Dri—Sump pumps. Yeomans Bros. Co., Chicago, Ill.
Draintrol—Traps. Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Dresserell—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
DriAir—Dehumidifiers, Tamms Silica Co., Chicago, Ill.
Drift Retriever—Cooling towers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Dri-Pipe—Insulation. Mystik Adhesive Products Div., Chicago Show Printing Co., Chicago, Ill.
Drive-IT—Hangers and supports, welders. Powder Power Tool Corp., Portland, Ore.
Dry-Ex—Water chillers. Acme Industries, Inc., Jackson, Mich.
Dry-Ice—Refrigerants. Pure Carbonic, Inc., New York, N. Y.
Drynamic—Dehumidifiers. Cargocaire Engineering Corp., New York, N. Y.
Dry-paC—Insulation. Ric-wiL Co., Cleveland, O.
Dryvin—Expansion bolts. Star Expansion Bolt Co., New York, N. Y.
Dualarc—Arc Welders. Electric Arc, Inc., Newark, N. J.
Dual-Clone—Dust collectors. Day Co., The, Minneapolis, Minn.
Dualsteel—Unions. Rockwood Sprinkler Co., Worcester, Mass.
Duboth—Boiler water treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Duco—Enamels and lacquers. du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept. Wilmington, Del.
Ductatherm—Thermostats. Mercoid Corp., The, Chicago, Ill.
Ducturns—Vanes. Tuttle & Bailey, Inc., New Britain, Conn.
Ductype—Fans. South Bend Air Products, Inc., South Bend, Ind.
Dulrae—Electrical radiant heating conductors. Critall Radiant Heating, Inc., Richard, New York, N. Y.
Dulux—Enamels and lacquers. du Pont de Nemours & Co. (Inc.) E. I., Fabrics & Finishes Dept., Wilmington, Del.
Duo Blo—Furnaces. American Furnace Co., St. Louis, Mo.
Duoflo—Pipe line strainers. Sheffler-Gross Co., Philadelphia, Pa.
Duo-Stat—Heating systems, thermostats. Johnson Service Co., Milwaukee, Wis.
Duotrol—Regulators. Automatic Control Co., St. Paul, Minn.
Duplex—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Duplex—Pipe cutting machines. Bignall & Keeler Machine Works, Edwardsville, Ill
Duplex—Pipe line strainers. Maid-O'-Mist, Inc., Chicago, Ill.
Duplex—Tubing. Bridgeport Brass Co., Bridgeport, Conn.
Durabel—Coatings. Perolin Co., Inc., Chicago, Ill.
Durabilt—Observation ports. Chicago Fire Brick Co., Chicago, Ill.
DuraBilt—Registers. Auer Register Co., Cleveland, O.
Duradiant—Gas burners. Selas Corp. of America, Philadelphia, Pa.
Dura-Flex—Registers. Auer Register Co., Cleveland, O.
Dura-Flex—Valves. Detroit Lubricator Co., Detroit, Mich.
Dura-Line—Registers. Auer Register Co., Cleveland, O.
Duranite—Enamels and lacquers. Zapon Div., Atlas Powder Co., North Chicago, Ill.
DuraSpeed—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.
Durco—Fans, fittings, joints, pipe, pumps, sheets, valves. Duriron Co., Inc., Dayton, O.
Durcopump—Fans, fittings, joints, pipe, pumps, sheets, valves. Duriron Co., Inc., Dayton, O.
Durex—Bearings. Moraine Products Div., General Motors Corp., Dayton, O.
Durichlor—Fans, fittings, joints, pipe, pumps, sheets, valves. Duriron Co., Inc., Dayton, O.
Durimet—Fans, fittings, joints, pipe, pumps, sheets, valves. Duriron Co., Inc., Dayton, O.
Durobrace—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Duro Gloss—Steel sheets. Jessop Steel Co., Washington, Pa.
Duroplastic—Caulking compounds. Acorn Refining Co., Cleveland, O.
Dustex—Dust collectors. Dust Filter Co., Chicago, Ill.
Dustkop—Dust collectors. Aget-Detroit Co., Ann Arbor, Mich.
Dust-Stop—Air Filters. Owens-Corning Fiberglas Corp., Toledo, O.
Dusttrap—Filters. Morp Industries, Inc., Staten Island, N. Y.
Dustube—Dust collectors. American Wheelabrator & Equipment Corp., Mishawaka, Ind.
Dutch Boy—Solder. National Lead Co., New York, N. Y.
Duxbak—Leather belting and packing. Schieren Co., Chas. A., New York, N. Y.
Dux-Sulation—Insulation. Wilson Inc., Grant, Chicago, Ill.
Dynaflow—Fans. South Bend Air Products, Inc., South Bend, Ind.
Dynamaster—Recorders. Bristol Co., The, Waterbury, Conn.
Dynatherm—Water heaters. Bethlehem Foundry & Machine Co., Bethlehem, Pa.
Dynetric—Balancing equipment. Gisholt Machine Co., Madison, Wis.

E-C—V belts. Goodyear Tire & Rubber Co., Akron, O.
E C & M—Motor controls, solenoids, switches. Electric Controller & Mfg. Co., Cleveland, O.
EMD—Blowers. L. J. Wing Mfg. Co., New York, N. Y.
E.Z.—Hangers or brackets, soot destroyers. Healy Ruff Co., St. Paul, Minn.
Eafco—Fittings. Eastern Foundry Co., Boyertown, Pa.
Eastern—Tanks. Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Easternoil—Oil burners. Eastern Oil Equipment Co., Portland, Me.
Easy-Flo—Solder. Handy & Harman, New York, N. Y.
Easyweld—Electrodes. Universal Power Corp., Cleveland, O.
Ebko—Conduit, jacketed and lined piping. Kaiser Co., E. B., Chicago, Ill.
Eclipse—Alarms, governors, regulators, separators, joints, indicator-controllers, traps, valves. Illinois Engineering Co., Chicago, Ill.
Eclipse—Hose. Bendix Aviation Corp., Eclipse-Pioneer Div., Peterboro, N. J.
Econolux—Boilers. Johnson Co., S. T., Phila-Philadelphia, Pa.
Econ-o-matic—Bases. American Pulley Co., Philadelphia, Pa.
Economizer—Nozzles. Bahnson Co., Winston-Salem, N. C.
Economy—Boilers, heaters. International Heater Co., Utica, N. Y.
Economy—Regulators. Dockson Corp., Detroit, Mich.
Economy—Unit ventilators. Arex Co., Chicago, Ill.
Econovent—Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.
Edgeseal—Air filters. Wilson & Co., Inc., Chicago, Ill.
Efco—Heat exchangers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Effecto-Grille—Grilles, registers. Turnbull Mfg. & Dist. Co., Detroit, Mich.
Effico—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Ehret's D.I.P.—Pipe. Ehret Magnesia Mfg. Co., Valley Forge, Pa.
"88"—Pipe covering. Eagle-Picher Co., Cincinnati, O.
88-A—Pipe vise stands. Nye Tool & Machine Co., Chicago, Ill.
Elasto Rib—Vibration isolating bases. Korfund Co., Inc., Long Island City, N. Y.
Electric Filter Watchman—Gages. Herbusch Corp., The, St. Louis, Mo.
Electrifugal—Centrifugal pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electro-Airmat—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Cell—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electrofluid—Hydraulic speed changers. Link-Belt Co., Philadelphia, Pa.
Electro-Hot—Heaters. Red Spot Electric Co., Tacoma, Wash.
Electro-Matic—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Mist Collector—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Rod—Pipe cleaning machines. Spartan Tool Co., Chicago, Ill.
Electro-Sheet—Sheets. American Brass Co., Waterbury, Conn.
Electroweld—Welders. Electric Arc., Inc., Newark, N. J.
Electro-Wind—Ventilators. Production Planning Co., Rochester, Mich.
Electrunite—Stainless steel tubing. Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Elesco—Fuel economizers superheaters, Combustion Engineering Co., Inc., New York, N. Y.
Elgex—Steam system treatment. Elgin Softener Corp., Elgin, Ill.
Elgin—Arc welders. Borm Mfg. Co., Elgin, Ill.
Elgin—Louvers and shutters. Elgo Shutter & Mfg. Co., Detroit, Mich.
Elite—Registers. Auer Register Co., Cleveland, O.
Elm—Dampers. Elgo Shutter & Mfg. Co., Detroit, Mich.
Elsco—Blowers, compressors, pumps, valves. Electric Sprayit Co., The, Sheboygan, Wis.
Elturn—Duct turning vanes. Barber-Colman Co., Rockford, Ill.
Embee—Cement and compounds. Montgomery Bros., San Francisco, Calif.
Emco—Meters, regulators. Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Enamel-Kote—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Enco—Burners, regulators. Engineer Co., New York, N. Y.
Enduro—Sheets, tubing. Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Enduro—Unions. Jefferson Union Co., Inc., New York, N. Y.
Enpo—Motors. Piqua Machine & Mfg. Co., Piqua, O.
Entrained Combustion—Gas burners. Mettler Co., Lee B., Los Angeles, Calif.
Equatherm—Zone control thermostat. Tallmadge & Co., Webster, East Orange, N. J.
Equiflo—Valves. Grinnell Co., Inc., Providence, R. I.
Eroduct—Insulation. Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Erwin—Dampers. Elgo Shutter & Mfg. Co., Detroit, Mich.
Esna—Nuts. Elastic Stop Nut Corp. of America, Union, N. J.
Esso—Oil burners. Gilbert & Barker Mfg. Co., West Springfield, Mass.
Esso Bond—Cement, refractories. Ramtite Co., The, Chicago, Ill.
Eureka—Valves. Ohio Pattern Wks. & Foundry Co., Eureka Valve Div., Cincinnati, O.
Everlasting—Bolts and studs. H. M Harper Co., Chicago, Ill.
Evactor—Pumps. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Evapotrol—Valves. Alco Valve Co., St. Louis, Mo.
Evanaction—Valves. Taylor Instrument Companies, Rochester, N. Y
Everedy—Boilers, oil burners. Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Everflex—Hose, coils, and tubing. Everhot Products Co., Chicago, Ill.
Everjet—Coatings. Barrett Div.; Allied Chemical & Dye Corp., New York, N. Y.
Eversharp—Cutters. Everhot Products Co., Chicago, Ill.
Evertite—Clamps. Everhot Products Co., Chicago, Ill.
Everwear—Ventilators. Southern States Iron Roofing Co., Savannah, Ga.
Evrtyte—Valves. Strong, Carlisle & Hammond Co., Cleveland, O.
Excel—Unions. Jefferson Union Co., Inc., New York, N. Y
Excelsior—Pumps. Foster Pump Works, Inc., Brooklyn, N. Y.
Excelso—Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Exhaustair—Fans. New York Blower Co., Chicago, Ill.
Exidust—Dust collectors. Lamson Corp., Syracuse, N. Y.
Extra Dry Esotoo—Liquid sulphur dioxide. Virginia Smelting Co., West Norfolk, Va.
Eye-Hye—Gages. Reliance Gauge Column Co., Cleveland, O.
Ez-arc—Arc welders. Will-Weld Mfg. Co., Inc., Omaha, Neb.
E-Z-ON—Damper quadrants. Gerett Corp., M A., Milwaukee, Wis.
Ezy-Kleen—Strainers. Blackmer Pump Co., Grand Rapids, Mich.

F & E—Stokers. Flynn & Emrich Co., Baltimore, Md.
Fabrikated—Grilles, registers. Independent Register Co., Cleveland, O., New York, N. Y.
Faircoseal—Valves. Fairbanks Co., New York, N. Y.
Fan-Air—Gas burners. Mettler Co., Lee B., Los Angeles, Calif.
Fan-Pac—Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill
Fanmix—Burners. Coppus Engineering Corp., Worcester, Mass.
Far-Air—Air conditioning units, filters, humidifiers. Farr Co., Los Angeles, Calif.
Farnsworth—Pumps. O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
Farragut—Packing. Darcoid Co., Inc., New York, N. Y.
Fast's—Couplings. Koppers Co., Inc., Bartlett Hayward Div., Baltimore, Md.
Favorite—Ratchet wrenches. Greene, Tweed & Co., North Wales, Pa.
Featherfin—Heating and cooling surface. Wing Mfg. Co., L. J., New York, N. Y.

Featherweight—Propeller fans. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.

Featherweight—Unit heaters. Wing Mfg. Co., L. J., New York, N. Y.

Fel-Pro—Gaskets, packing. Felt Products Mfg. Co., Chicago, Ill.

Felt Cote—Metal sheets. American Steel Band Co., Heidelberg, Pa.

Fenestra—Heat insulating windows. Detroit Steel Products Co., Detroit, Mich.

Fenn's Rotary—Ventilators. Waverly Heating Supply Co., Boston, Mass.

Fenox—Compounds. Halowax Products Div., Union Carbide & Carbon Corp., New York, N. Y.

Fero—Radiation. Burnham Corp., Boiler Div., Irvington, N. J.

Ferrenewo—Valves. Lunkenheimer Co., Cincinnati, O.

Ferroclad—Insulation. Truscon Steel Company, Youngstown, O.

Ferro-Therm—Insulation. American Flange & Mfg. Co., New York, N. Y.

Ferroweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Fiberglas. Duct connections, tape. Bauer & Black, Div. of the Kendall Co., Chicago, Ill.

Fiberglas—Insulation. Owens-Corning Fiberglas Corp., Toledo, O.

Fiberlite—Insulation. Insulite Co., Minneapolis, Minn.

Fibrum—Plastic tubing. Irvington Varnish and Insulator Co., Irvington, N. J.

Filmflo—Deaerators. Croll-Reynolds Engineering Co., Inc., New York, N. Y.

Filt-R-Stil—Water treatment. American Cyanamid & Chemical Corp., New York, N. Y.

Finco—Finned tubing. Fintube Coil Corp., Alhambra, Calif.

Fine-Screen—Strainers. Yarnall-Waring Co., Philadelphia, Pa.

Fin-Flex—Registers. Auer Register Co., Cleveland, O.

Findlay—Stokers. Central Rubber & Steel Corp., Findlay, O.

Finmaster—Radiation. Smith Co., Inc., H. B., The, Westfield, Mass.

Finstrip—Heaters. Wiegand Co., Edwin L., Pittsburgh, Pa.

Firecrete—Refractories. Johns-Manville, New York, N. Y.

Fire-Felt — Insulation. Johns-Manville, New York, N. Y.

Fire-Guard—Stokers. Peerless Mfg. Corp., Louisville, Ky.

Fire-Hearth—Refractories. Fireline Stove & Furnace Lining Co., Chicago, Ill.

Fire Tender—Stokers. Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.

Firefoil—Insulating panel. Carey Mfg. Co., Philip, Cincinnati, O.

Fireite—Furnace cement refractories. Johns-Manville, New York, N. Y.

Fireset—Refractories. Walsh Refractories Corp., St. Louis, Mo.

Fireye—Alarms, flame failure controls, systems. Combustion Control Corp., Cambridge, Mass.

Firomatic—Filters, gages, links, switches, valves. Morse-Smith-Morse, Inc., Watertown, Mass.

Firma—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.

5373—Plastic tubing. Irvington Varnish & Insulator Co., Irvington, N. J.

Flamebuster—Spray nozzles. Grinnell Co., Inc., Providence, R. I.

Flame-otrol—Controls. Wheelco Instruments Co., Chicago, Ill.

Flaremaster—Benders. Everhot Products Co., Chicago, Ill.

Flat-Belt—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.

Flatjet—Spray nozzles. Spraying Systems Co., Chicago, Ill.

Fleetweld—Welding electrodes. Lincoln Electric Co., Cleveland, O.

Fleet-X—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.

Flexarc—Arc welders. Westinghouse Electric Corp., Pittsburgh, Pa.

Flexaust—Hose. American Ventilating Hose Co., New York, N. Y.

Flexcord—Drives. Gates Rubber Co., Denver, Col.

Flexeal—Gaskets. Goetze Branch, Johns-Manville, New York, N. Y.

Flexiblac—Protective coatings. Samuel Cabot, Inc., Boston, Mass.

Flexigrip—Fittings. Gustin Bacon Mfg. Co., Kansas City, Mo.

Flextite—Gate valves. Ohio Brass Co., Mansfield, O.

Flexiwound—Gaskets. Azor Corp., Irvington, N. J.

Flexloc—Lock nuts. Standard Pressed Steel Co., Jenkintown, Pa.

Flexodisc—Expansion joints. Croll-Reynolds Engineering Co., Inc., New York, N. Y.

Flexidur—Nozzles. Bahnson Co., Winston-Salem, N. C.

Flex-Tube — Analyzers, gages, manometers. Dwyer Mfg. Co., F. W., Chicago, Ill.

Floatrol—Switches, regulators. Automatic Control Co., St. Paul, Minn.

Flo-Controls—Fittings. W-H Engineering Co., Chicago, Ill.

Flo-Gage—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.

Flo-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.

Flo-Master—Valves. W-H Engineering Co., Chicago, Ill.

Flo-scope—Meters. Selas Corp. of America, Philadelphia, Pa.

Flotrol—Humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.

Flo-watch—Flow meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.

Flowrator—Meters. Fischer & Porter Co., Hatboro, Pa.

Flualyzer—Analyzers. Engelhard, Inc., Chas., Newark, N. J.

Fluid Drive—Speed changer. American Blower Corp., Detroit, Mich.

Flush-Kleen—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.

Flux-Stik—Solder and fluxes. Lake Chemical Co., Chicago, Ill.

Foambuster—Compounds. Cannon Chemical Co., Inc., Everett, Mass.

Foamglas—Insulation. Armstrong Cork Co., Lancaster, Pa.

Foamglas—Insulation. Pittsburgh Corning Corp., Pittsburgh, Pa.

Foamglas—Insulation. Pittsburgh Plate Glass Co., Pittsburgh, Pa.

Force-Flo—Circulators, fittings, heaters, regulators, systems, tanks. Kehm Corp., The, Chicago, Ill.

Fordair—Compressors. Schramm, Inc., West Chester, Pa.

Forest Fleece—Insulation. Doheny Co., John J., Belmont, Mass.

Formet—Water treatment. Perolin Co., Inc., Chicago, Ill.

4-Point—Control systems. Perfex Corp., Milwaukee, Wis.

"400" Series—Heaters. Fitzgibbons Boiler Co., Inc., New York, N. Y.

Fracto-Crete—Refractories. Ramtite Co., The, Chicago, Ill

Francke—Flexible couplings. Waldron Corp., John, New Brunswick, N. J.

Franzite—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Free-Aire—Air conditioning units, heaters. Kehm Corp., The, Chicago, Ill.

Free-Flow—Ventilators. Burt Mfg. Co., Akron, O.

Fre-Flo—Strainers. Fisher Governor, Marshalltown, Ia.

Freon—Refrigerant. Kinetic Chemicals, Inc., Wilmington, Del.

Fresh Air Maker—Propeller fans, units, ventilators. Schwitzer-Cummins Co., Indianapolis, Ind.

Frevent—Valves. Bridgeport Brass Co., Bridgeport, Conn.

Frictionized—Belting. Baldwin Belting, Inc., New York, N. Y

Frigid—High pressure blowers, propeller fan blades and fans, paint spray booths, air conditioning units, ventilators. Circulators & Devices Mfg. Corp., New York, N. Y.

Frigistat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Frigitower—Cooling towers. Thermal Industries, Indio, Calif.

Frostaire—Air conditioning units. Palmer Mfg. Corp., Phoenix, Ariz

Fuel-O-Meter—Gages. Harvey, Inc., Sid, Valley Stream, N. Y.

Fuel Saver—Boilers. International Boiler Works Co., East Stroudsburg, Pa.

Fuelsaver—Boilers. Columbia Radiator Co., McKeesport, Pa.

Fulflo—Filters. Commercial Filters Corp., Boston, Mass.

Fulljet—Spray nozzles. Spraying Systems Co., Chicago, Ill.

Fulscope—Humidistats, recorders, recorder-controllers, regulators. Taylor Instrument Companies, Rochester, N. Y.

Fuseair—Air diffusers. Aladdin Heating Corp., Oakland, Calif.

Fusomatic—Links. Preferred Utilities Mfg. Corp., New York, N. Y.

Fybr-Tech—Gaskets and sheets. Technical Ply-Woods, Chicago, Ill.

Fyr-Feeder—Spreader stokers. American Coal Burner Co., Chicago, Ill.

Fyrite—Analyzers. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

Fyritec—Recorders. Cole-Sewell Engineering Co., St. Paul, Minn.

G. B. C.—Fans, General Blower Co., Inc., Philadelphia, Pa.

G-E—Compressors, condensers, thermostats. General Electric Co., Air Conditioning Dept., Bloomfield, N. J.

G-Fin—Cooling and heating surface. Griscom-Russell Co., The, New York, N. Y.

GIL—Filters, regulators. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.

GIL Governoret—Valves. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.

GIL No-Hum—Check valves. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.

G-R—Aftercoolers, oil coolers, water chillers, regulators. Griscom-Russell Co., The, New York, N. Y.

G-R—Unit coolers and air conditioners. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.

Galongage—Gages. Applied Mechanics Co., Boston, Mass.

Galv-O-Zinc—Coatings. Blue Ridge Talc Co., Henry, Va.

Gaco-Neoprene—Blades, coatings, fittings, hose, housings, pipe, valves. Gates Engineering Co., Wilmington, Del.

Gaco-Innerseal—Couplings. Gates Engineering Co., Wilmington, Del.

Gasgun—Torches. Century Aircraft, Inglewood, Calif.

Gast—Filters, separators. Johnson Corp., The, Three Rivers, Mich.

Gasteam—Radiators. Clow & Sons, James B., Chicago, Ill.

Gasweld—Torches, welding rod and apparatus. Liquid Carbonic Corp., The, Chicago, Ill.

Gasweld—Welding and cutting apparatus. Ergolyte Mfg. Co., Philadelphia, Pa.

Geddes—Radiation. Fowler & Wolfe Radiator Co., Norristown, Pa.

Gemaco—Compressors. General Machinery Co., Spokane, Wash.

Gemco—Bolts, clamps, hangers and supports, insulation. Goodloe E. Moore Co., Danville, Ill.

Gemco—Air conditioning units. General Engineering & Mfg. Co., St. Louis, Mo.

Gemware—Hygrometers, psychrometers, thermometers. G. M. Mfg. Co., New York, N. Y.

Genuine Stillson—Wrenches. Walworth Co., New York, N. Y.

Gerotor—Rotary pumps. May Oil Burner Corp., Baltimore, Md.

Giant—Radiation. John J. Nesbitt, Inc., Philadelphia, Pa.

Giant—Radiator hangers. Western Hanger Co., San Francisco, Calif.

Gilbarco—Compressors, oil burners. Gilbert & Barker Mfg. Co., West Springfield, Mass.

Gilsonite—Protective coatings. Ohmlac Paint & Refining Co., Chicago, Ill.

Gilt Edge—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.

Gland-Pakt—Expansion joints. Yarnall-Waring Co., Philadelphia, Pa.

Glazola—Caulking compounds. Nebel Mfg. Co., Cleveland, O.

Globak—Pipe flanges. Midwest Piping & Supply Co., Inc., St. Louis, Mo.

Glo-Tech—Glass pipe. Fischer & Porter Co., Hatboro, Pa.

Glowan—Gas burners. Martin Co., Inc., J. O., San Francisco, Calif.

Gloweld—Welded steel tubing. Globe Steel Tubes Co., Milwaukee, Wis.

Glucosates—Compounds, steam system treatment. Haering & Co., Inc., D. W., Chicago, Ill.

Goetzerit—Gaskets. Goetze Branch, Johns-Manville, New York, N. Y.

Gohi—Sheets. Newport Rolling Mill Co., Newport, Ky.

Gold Bond—Insulation. National Gypsum Co., Buffalo, N. Y.

Goodyearite—Packing. Goodyear Tire & Rubber Co., Akron, O.

Grad-U-Motor—Damper operators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Gradustat—Regulators, thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Gradutrol — Diaphragm valves. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Graylite—Insulation. Insulite Co., Minneapolis, Minn.

Greastop—Air filters. Air-Maze Corp., Cleveland, O.

Grid—Cooling and heating surface condensers, radiation, unit heaters. Murray Mfg. Co., D. J., Wausau, Wis.

Gripzins—Expansion bolts. Star Expansion Bolt Co., New York, N. Y.

Gritseald—Rotary pumps. St. Louis Tool Co., St. Louis, Mo.

Gross-Aire—Furnaces. Grossenbacher Furnace Co., Overland, Mo.

Gruvagrip—Couplings. Gustin Bacon Mfg. Co., Kansas City, Mo.

Guardian—Gaskets. Garlock Packing Co., Palmyra, N. Y.

Gunchrome—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

Gunmix—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

GunPakt—Expansion joints. Yarnall-Waring Co., Philadelphia, Pa.

Gusher—Centrifugal pumps. Ruthman Machinery Co., Cincinnati, O.

Guthfan—Fans. Guth Co., Edwin F., St. Louis, Mo.

Gyrol Fluid Drive—Speed changer. American Blower Corp., Detroit, Mich.

H-B—Heaters. Handley Brown Heater Co., Jackson, Mich.

H & C—Grilles, registers. Hart & Cooley Mfg. Co., Holland, Mich.

H-O-H—Compounds, feeders, steam system and water treatment. Haering & Co., Inc., D. W., Chicago, Ill.

HS—Fans. American Blower Corp., Detroit, Mich.

H-T—Smoke alarms. Autempco Corp., New York, N. Y.

Hairbestos—Insulation. Wilson & Co., Inc., Chicago, Ill.

Haircraft—Insulation. Wilson & Co., Inc., Chicago, Ill.
Hammerkraft—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Hammermill—Belting. Goodyear Tire & Rubber Co., Akron, O.
Hammer-On—Damper quadrants. Air Control Products, Inc., Coopersville, Mich.
Hammer-Set—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Hancock—Valves. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Handy—Benders. Holsclaw Bros., Inc., Evansville, Ind.
Handy—Ducts and duct fittings. Meyer & Bro. Co., F., Peoria, Ill.
Handy Andy—Vise stands. Western Wire Products Co., St. Louis, Mo.
Hardweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Hartman—Air conditioning units. Norwood Filtration Co., The, Florence, Mass.
Hartmann—Heaters. Montgomery Bros., San Francisco, Calif.
Hazleton—Pumps, strainers, valves. Barrett, Haentjens & Co., Hazleton, Pa.
Heacon—Dampers. Thermix Corp., The, Greenwich, Conn.
Health-Air—Ventilator and filter units. Reliable Sheet Metal Engineering Co., Chicago, Ill.
Health-Aire—Fans, heaters, housings, unit coolers, ventilators. Johnson Fan & Blower Co., Chicago, Ill.
Health-Crete—Refractories. Quigley Co., Inc., New York, N. Y.
Hearth Patch—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Heart-Oak—Belting. Graton & Knight Co., Worcester, Mass.
Heat-aid—Refractories. Pyrolite Products Co., Uniontown, Pa.
Heat Extractor—Boilers. National Radiator Co., The, Johnstown, Pa.
Heat-O-Meter—Temperature regulators, thermostats. Miller-Harris Instrument Co., Milwaukee, Wis.
Heat-Pak—Boilers, heaters. Aldrich Co., The, Wyoming, Ill.
Heatrex—Heaters. Whiting Stoker Sales Co., Chicago, Ill.
Heat-Rite—Registers. Auer Register Co., Cleveland, O.
Heatsum—Conductors. Roberson Co., L. N., Seattle, Wash.
Heat-Tite—Insulating cement. Ramtite Co., The, Chicago, Ill.
Heat-Valve—Ventilators. Swartwout Co., Cleveland, O.
Heat-X—Heat exchangers, water coolers. Heat-X-Changer Co., Inc., The, Brewster, N. Y.
He-De-We—Valves. Harvey, Inc., Sid, Valley Stream, N. Y.
Helical—Tubing. Rome-Turney Radiator Co., Rome, N. Y.
Heliflow—Aftercoolers, chillers, oil coolers, water heaters. Graham Mfg. Co., Inc., New York, N. Y.
Hellite — Refractories. Johns-Manville, New York, N. Y.
Herco—Arc welders. Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Hercules—Flexible couplings. Stewart-Rogers, Inc., Philadelphia, Pa.
Herculoy—Welding rod, tubing. Revere Copper and Brass, Inc., New York, N. Y.
Hevikoat—Electrodes. Universal Power Corp., Cleveland, Ohio.
Highflex—Belting. Goodrich Co., B. F., Akron, O.
High-Ten-500—Solder. Industrial Service Laboratories, Milwaukee, Wis.
Hi-Gloss—Steel sheets. Jessop Steel Co., Washington, Pa.
Hilger—Chillers, refrigerating compressors, unit coolers, unit air conditioners, valves. XL Refrigerating Co., Inc., Chicago, Ill.
Hi-Lift—Pumps. Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Hi-Lo—Alarms. Yarnell-Waring Co., Philadelphia, Pa.
Hi-Lo—Pumps. Yeomans Bros. Co., Chicago, Ill.
Hirae—Electric heating conductors. Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Hi-Seal—Cement and compounds. Greene, Tweed & Co., North Wales, Pa.
Hi-Speed—Welding and cutting apparatus. Dockson Corp., Detroit, Mich.
Hi-Spra—Spray nozzles. Thermal Industries, Indio, Calif.
Hitchings—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Hi-Temp—Insulation. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Hi-Test—Boilers. Kewanee Boiler Co., Kewanee, Ill.
Hoffman—Water heaters. Clayton & Lambert Mfg. Co., Louisville, Ky.
Holdtite—Solder. American Brass Co., Waterbury, Conn.
Holgun—Drills. Van Dorn Electric Tool Co., Towson, Md.
Hollo-Tech—Doors and panels. Technical Ply-Woods, Chicago, Ill.
Holt—Strainers, tube cleaners. Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Holtite—Clamps. Yarnall-Waring Co., Philadelphia, Pa.
Horneblende—Calking compounds. North American Fibre Products Co., The, Cleveland, O.
Horton—Tanks. Chicago Bridge & Iron Co., Chicago, Ill.
Hot Shot—Pumps. Yeomans Bros. Co., Chicago, Ill.
Hot Spot—Spot welders. Acme Electric Welder Co., Los Angeles, Calif.
Hovalco—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.
Huber—Stokers. Flynn & Emrich Co., Baltimore, Md.
Humiclean—Cleaning compounds, water treatment. Carolina Aniline & Extract Co., Charlotte, N. C.
Humidair—Humidifiers. Skilbeck Mfg. Co., Kenosha, Wis.
Humidigraph—Humidity recorders. Bristol Co., Waterbury, Conn.
Humidiguide—Hygrometers. Taylor Instrument Companies, Rochester, N. Y.
Humidostat—Humidistats. Johnson Service Co., Milwaukee, Wis.
Humiduct—Humidifiers, unit air conditioners. Bahnson Co., Winston-Salem, N. C.
Humid-U-Stat—Humidistats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Humi-Temps—Unit air coolers. Larkin Coils, Atlanta, Ga.
Humphrey—Unit heaters. General Gas Light Co., Kalamazoo, Mich.
Hurrivent—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Hycarb—Electrodes. Universal Power Corp., Cleveland, O.
Hydralt—Protective coatings. Flintkote Co., The, New York, N. Y.
Hydramotor—Valves. General Controls Co., Glendale, Calif.
Hydraulic Coupling—Speed changer. American Blower Corp., Detroit, Mich.
Hydro—Recorders. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Hydro-Clone—Dust collectors, welding fume exhausters. Whiting Corp., Harvey, Ill.
Hydro-Flo—Heating systems. Bell & Gossett Co., Morton Grove, Ill.
Hydro-Foil—Pumps. Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Hydron—Bellows, traps. Clifford Mfg. Co., Boston, Mass.
Hydrovac—Pumps. Ames Hydrovac Inc., Brooklyn, N. Y.
Hydro-Whirl—Dust collectors, spray booths. Peters-Dalton, Inc., Detroit, Mich.
Hydryer—Dehumidifiers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Hy-Duty—Blower wheels, fans. Schwitzer-Cummins Co., Indianapolis, Ind.
Hy-Power—Shears and snips. Wiss & Sons Co., J., Newark, N. J.
Hy-Speed—Pipe vises. Munton Mfg. Co., Franklin Park, Ill.
Hy-Temp—Cement, insulation. Keasbey & Mattison Co., Ambler, Pa.
Hytempite—Cement, refractories. Quigley Co., Inc., New York, N. Y.
Hy-Test—Water heaters, Smith Co, Inc., H. B., The, Westfield, Mass.

IMO—Pumps. De Laval Steam Turbine Co., Trenton, N. J.
I-R—Ingersoll-Rand, New York, N. Y.
IVCO—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.
Ice-O-Matic—Refrigerating compressors. Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
Icy-Flo—Accumulators. McQuay, Inc., Minneapolis, Minn.
Ideal—Blowers. Perfection Grate & Stoker Co., Springfield, Mass.
Ideal—Speed changers, pulleys and sheaves. Lovejoy Flexible Coupling Co., Chicago, Ill.
Ideal—Traps. Nason Co., Detroit, Mich.
Ideal—Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Immersatherm—Thermostats. Mercoid Corp., The, Chicago, Ill.
Impact—Spray nozzles. Cooling Tower Co., Inc., The, Div. of the Fluor Corp., Ltd., New York, N. Y.
Impulse—Traps. Yarnall-Waring Co., Philadelphia, Pa.
Inco—Electrodes, pipe fittings, pipe, rod, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Inconel—Pipe fittings, pipe, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Inconel—Tubing. Trent Tube Mfg. Co., East Troy, Wis.
Indeeco—Heaters. Industrial Engineering & Equipment Co., St. Louis, Mo.
IngAclad—Stainless clad sheets. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
In-Hib-Co—Protective coatings. Haering & Co., Inc., D. W., Chicago, Ill.
Inkstop—Air filters. Air-Maze Corp., Cleveland, O.
Ins-lite—Insulation. Insulite Co., Minneapolis, Minn.
Instant—Heaters, preheaters. Johnson Corp., The, Three Rivers, Mich.
Insulag—Insulation. Quigley Co., Inc., New York, N. Y.
Insulbrix—Refractories. Quigley Co., Inc., New York, N. Y.
Insulcrete — Insulating cement, refractories. Quigley Co., Inc., New York, N. Y.
Insulduct—Ducts and duct fittings. Smith-Raymond Co., Columbus, Ga.
Insulfil—Insulation. Refractory & Insulation Corp., New York, N. Y.
Insulwool—Insulation. General Insulating Products Co., Brooklyn, N. Y.
Insutube—Insulation. Union Asbestos & Rubber Co., Cicero, Ill.
Integral Jet—Burners. Stout & Sons, David, St. Louis, Mo.
Intensarc—Electrodes. National Carbon Co., New York, N. Y.
Inter-Matic—Time switches. International Register Co., Chicago, Ill.
Involute—Spray nozzles. Yarnall-Waring Co., Philadelphia, Pa.
Ionaire—Ionization apparatus. Electroaire Corp., Chicago, Ill.
Irenew—Valves. Powell Co., Wm., Cincinnati, O.
Iron Lung—Ventilators. Powermatic Ventilator Co., Cleveland, O.
Ironset—Furnace cement. Fireline Stove & Furnace Lining Co., Chicago, Ill.
Ironweld—Compounds. Sight Feed Generator Co., Richmond, Ind.
Irv-o-lite—Plastic tubing. Irvington Varnish and Insulator Co., Irvington, N. J.
Isomodes—Bases and pads, vibration isolating. M. B. Mfg Co., The, New Haven, Conn.

J & C—Burners, fans, furnaces, heaters. Jackson & Church Co., Saginaw, Mich.
J. B.—Pumps, Pacific Pump Works, Huntington Park, Calif.
J F S—Speed changers. Stephens-Adamson Mfg. Co., Aurora, Ill.
J-M Ball—Floats, traps. Cryer Trap & Valve Co., Inc., New York, N. Y.
Jackhamer—Drills. Ingersoll-Rand Co., New York, N. Y.
Jacobus—Valves. Majot Automatic Machine Co., Inc., East Orange, N. J.
Jahco—Ball bearings, compressors. Jack & Heintz Precision Industries, Inc., Cleveland, O.
Janitrol—Boilers, burners, heaters, systems, unit air conditioners. Surface Combustion Corp., Toledo, O.
Jarco—Unions, valves. Jarecki Mfg. Co., Erie, Pa.
Jay Gee Silica Gel—Dehydrators. Joliet Chemicals, Inc., Joliet, Ill.
Ject-O-Valve — Ventilators. Swartwout Co., Cleveland, O.
Jennings—Pumps, ejectors. Nash Engineering Co., South Norwalk, Conn.
Jetal—Protective coatings. Alrose Chemical Co., Providence, R. I.
Jetcote—Protective coatings. Watson-Standard Co., Pittsburgh, Pa.
Jiffy Clips—Hangers and supports. Minerallac Electric Co., Chicago, Ill.
Jiffy "Dial"—Regulators. Parker-Kalon Corp., New York, N. Y.
John Crane—Cement and compounds. Crane Packing Co., Chicago, Ill.
Jointite—Insulation. Mundet Cork Corp., North Bergen, N. J.
Jones—Stokers. Riley Stoker Corp., Worcester, Mass.
Junior—Radiation. Weil-McLain Co., Michigan City, Ind.
JusRite—Ducts and duct fittings. Corbman Bros., Inc., Philadelphia, Pa.

K—Fittings. Kuhns Brothers Co., Dayton, O.
K. A. T.—Compounds and water treatment. American K.A.T. Corp., New York, N. Y.
K-B—Dampers, regulators. Kerentoff, G. L., Cincinnati, O.
K-Fin—Cooling and heating surface. Griscom-Russell Co., The, New York, N. Y.
K-G Leak-Pruf—Gages. King Gauge & Mfg. Co., New Haven, Conn.
K and M—Alarms, controls, strainers, traps, valves. Kieley & Mueller, Inc., North Bergen, N. J.
K-Master—Filters, strainers, traps, valves. Kaye & MacDonald, Inc., West Orange, N. J.
K-S-V—Ventilators. Kernchen Co., Chicago, Ill.
Kable Kord—Belting. Gilmer Co., L. H., Div. of United States Rubber Co., Philadelphia, Pa.
Kane—Boilers. Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Karbate—Carbon pipe, heat exchangers, pumps. National Carbon Co., New York, N. Y.
Kasson—Motors. General Die and Stamping Co., New York, N. Y.
Kathabar—Dehumidifiers, humidifiers, unit air conditioners. Surface Combustion Corp., Toledo, O.
Kaukit—Caulking compounds. Sonneborn Sons, Inc., L., New York, N. Y.
Kemtex—Water softener. MacDermid Chemical Co., Bristol, Conn.
Kentucky—Sheets. Newport Rolling Mill Co., Newport, Ky.
Keystone—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Key-Tite—Cement and compounds. Key Co., East St. Louis, Ill.

Kidskin—Packing. Darcoid Co., Inc., New York, N. Y.
Kimsul — Insulation. Kimberly-Clark Corp., Neenah, Wis.
King-clip—Valves. Lunkenheimer Co., Cincinnati, O.
King Pemco—Gages. Petroleum Equipment Mfg. Co., New Haven, Conn.
Kleen Air—Air filters. Kaye & MacDonald, Inc., West Orange, N. J.
Kleen Tube—Heaters. Vapor Car Heating Co., Inc., Chicago, Ill.
Kleenflo—Unit air filters. Air-Maze Corp., Cleveland, O.
Klingtite—Belting. Goodyear Tire & Rubber Co., Akron, O.
Klixon—Temperature controls, valves. Spencer Thermostat Co., Attleboro, Mass.
Klondike—Arc welders. Fern, Ralph, Scranton, Pa.
Klosd—Motors. Sterling Electric Motors, Inc., Los Angeles, Calif.
Knight-Ware—Pipe, prefabricated ducts, valves, ventilators. Knight, Maurice A., Akron, O.
Knock-Out—Arc welders, torches. Lee Co., K. O., Aberdeen, S. D.
Kno-Draft—Air diffusers. Connor Engineering Corp., W. B., New York, N. Y.
Kontrol Master—Air valves. Kieley & Mueller, Inc., North Bergen, N. J.
Kontrol Motor—Diaphragm valves. Kieley & Mueller, Inc., North Bergen, N. J.
Kool-Shade—Solar heat resisting screens. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Kooler-Aire — Commercial air conditioners. United States Air Conditioning Corp., Minneapolis, Minn.
Korolac—Protective coatings. Goodrich Co., B. F., Akron, O.
Koroseal—Plastic tubing, protective coatings. Goodrich Co., B. F., Akron, O.
Koven—Heaters. Waterfilm Boilers, Inc., Jersey City, N. J.
Kres Kno—Boilers. Kresno-Stamm Mfg. Co., (America), Inc., Palisades Park, N. J.
Kristokrak—Enamels and lacquers. Zapon Div., Atlas Powder Co., North Chicago, Ill.
Kromatrol—Colorimeters. Will Corp., Rochester, N. Y.
Krome Kote—Coatings. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Kwikflux—Solder. Special Chemicals Corp., New York, N. Y.
Kwik-way—Regulators. Hart & Cooley Mfg. Co., Holland, Mich.

L. A.—Motors. The Louis Allis Co., Milwaukee, Wis.
L M—Tubing. Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
L&N—Regulators. Leeds & Northrup Co., Philadelphia, Pa.
L-R—Couplings. Lovejoy Flexible Couplings Co., Chicago, Ill.
L. R. D.—Valves. Grinnell Co., Inc., Providence, R. I.
Laddi—Heaters. Johnson Co., S. T., Philadelphia, Pa.
Lamneck—Ducts and duct fittings. Clayton & Lambert Mfg. Co., Middletown, O.
Latenaire—Air conditioning units. American Coils Co., Newark, N. J.
Lawson—Wrenches. USHCO Mfg. Co., Inc., Buffalo, N. Y.
L-Blow—Fans, ventilators. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Lead-Sealed—Lead sheets. Continental Steel Corp., Kokomo, Ind.
Leaflex—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Leak-Pruf—Gages. Petroleum Equipment Mfg. Co., New Haven, Conn.
Lectrodryer—Dehumidifiers. Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.
Ledaloyl—Sleeve bearings. Johnson Bronze Co., New Castle, Pa.
Leeds—Switches. Walton Co., Hartford, Conn.
Letheray—Sterilizing lamps. Hanovia Chemical & Mfg. Co., Newark, N. J.
Levelometer—Gages, recorders. Liquidometer Corp., Long Island City, N. Y.
Level-Trol—Regulators. Fisher Governor Co., Marshalltown, Ia.
Liberty—Packing. Johns-Manville, New York, N. Y.
Liberty—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Light Duty—Pulleys. Gates Rubber Co., The, Denver, Colo.
Lightning — Cleaning compounds. Western Chemical Co., Kansas City, Mo.
Lightweight Champion—Pipe cutting machines. Nye Tool & Machine Co., Chicago, Ill.
Lightweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Lima—Stokers. Carnes, Inc., John R., Lima, O.
Limit-Load—Centrifugal fans. Buffalo Forge Co., Buffalo, N. Y.
Limitorque—Valves. Philadelphia Gear Works, Inc., Philadelphia, Pa.
Limpet—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Lineflow—Fans. American Blower Corp., Detroit, Mich.
Line-o-flo—Air diffusers, grilles. Barber-Colman Co., Rockford, Ill.
Lin-X—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Lipco—Cement lined fittings and pipe. Cement Lined Pipe Co., Lynn, Mass.
Lipman—Compressors, cooling surface, water chillers. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Liquid-Fin — Heat exchangers. Remco, Inc., Zelienople, Pa.
Liquivator—Steam traps. Morehead Mfg. Co., Detroit, Mich.
Liquon—Filters, water softeners and treatments. Liquid Conditioning Corp., Linden, N. J.
Lithcote—Coatings. Lithgow Corp., Chicago, Ill.
Little Blacksmith—Punches, shears. Kidder Mfg. Co., Inc., J. F. Burlington, Vt.
Little Giant—Sump pumps. Chicago Pump Co., Chicago, Ill.
Little Giant—Stocks and dies. Greenfield Tap & Die Corp., Greenfield, Mass.
Little Giant—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Livermont—Wrenches. Richmont, Inc., Los Angeles, Calif.
Lloyd—Solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Lo-Blast—Burners. Mid-Continent Metal Products Co., Chicago, Ill.
Locarb—Electrodes. Universal Power Corp., Cleveland, O.
Lockaire—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.
Lockseam—Pipe. Naylor Pipe Co., Chicago, Ill.
Locktite—Regulators, dampers. Ohio Products Co., Cleveland, O.
Lodi—Boilers. Super Mold Corp., Lodi, Calif.
Lok-Joint—Insulation. Insulite Co., Minneapolis, Minn.
Lolag—Heaters. American Instrument Co., Silver Spring, Md.
Lo-Maintenance—Starters. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Longrip—Pipe extractors. Ridge Tool Co., Elyria, O.
Lookout Heggie-Simplex—Boilers. Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Lord Burnham—Boilers. Burnham Corp., Boiler Div., Irvington. N. Y.
Lornate—Ventilators. Hirschman-Pohle Co., Inc., LeRoy N. Y.
Lowcost—Boilers. Murray Iron Works Co., Burlington, Ia.
Loxin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Luminarc—Electrodes. Universal Power Corp., Cleveland, O.
Lyonore Metal—Sheets. Lyon, Conklin & Co., Inc., Baltimore, Md.

M. E.—Motors. Marathon Electric Mfg. Corp., Wausau, Wis.
M. & E.—Cooling surface, heat exchangers, tubing, unit coolers, unit heaters. Merchant & Evans Co., Philadelphia, Pa.
M & F—Rubber base enamel. American-Marietta Co., Chicago, Ill.
M & H—Sheets. Matthiessen & Hegeler Zinc Co., La Salle, Ill.
M & M—Alarms, cut-offs, feeders, humidifiers, indicators, operators, pumps, regulators, switches, valves. McDonnell & Miller, Inc., Chicago, Ill.
M & S—Gaskets. Mitchell & Smith, Inc., Detroit, Mich.
MIF—Couplings, fittings. Malleable Iron Fittings Co., Branford, Conn.
MKO—Pumps. Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
M-R-C—Ball bearings. Marlin-Rockwell Corp., Jamestown, N. Y.
MTB—Oil burners. John Zink Co., Tulsa, Okla.
M/W and A/C Airmat—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Macheta—Fans, fan blades, ventilators. Aerovent Fan Co., Piqua, O.
Magic—Cement and compounds. Blue Ridge Talc Co., Henry, Va.
Magic Eye Door—Door controls. Stanley Works, The, New Britain, Conn.
Magic Flame—Stokers. Link-Belt Co., Chicago, Ill.
Magic-Grip—Sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Magic-Weather—Air washers, fans. Ballantyne Co., Omaha, Neb.
Magna-Fin—Direct radiation. Rittling Corp., The, Buffalo, N. Y.
Magna-Therm—Heaters. Rittling Corp., Buffalo, N. Y.
Magnefer—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Magnetrol—Alarms, boiler cut-offs, switches. Schaub Engineering Co., Inc., Fred H., Chicago, Ill.
Manganend—Electrodes. Arcos Corp., Philadelphia, Pa.
Manganweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Mangenarc—Electrodes. Universal Power Corp., Cleveland, O.
Manotox—Coatings. X-Pando Corp., Long Island City, N. Y.
Manu-Rod—Pipe cleaning machines. Spartan Tool Co., Chicago, Ill.
Mark Time—Time switches, time delay relays. Rhodes, Inc., M. H., Hartford, Conn.
Marocol—Compounds. O'Brien Industries, Jersey City, N. J.
Marsalis—Dust collectors, fans, pumps, ventilators, air conditioning units. American Metal Products Co., Fort Worth, Tex.
Martell—Packing. France Packing Co., Tacony, Philadelphia, Pa.
Marvair—Air conditioning units. Muncie Gear Works, Muncie, Ind.
Marvelous—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Masco—Combustion chambers. Munn & Steele, Inc., Newark, N. J.
Mascobond—Furnace cement. Munn & Steele, Inc., Newark, N. J.
Mascocement—Refractories. Munn & Steele, Inc., Newark, N. J.
Mascokast—Refractories. Munn & Steele, Inc., Newark, N. J.
Mascolite—Pipe insulation. Munn & Steele, Inc., Newark, N. J.
Mascote—Insulation. Munn & Steele, Inc., Newark, N. J.
Massachusetts—Fans, unit heaters, blower wheels, air washers, housings. Bishop & Babcock Mfg. Co., Cleveland, O.
Master—Stokers. Muncie Gear Wks., Inc., Muncie, Ind.
Master—Speed changers, controls, thermostats, regulators, switches. White Mfg. Co., St. Paul, Minn.
Master—Unions. Jefferson Union Co., Inc., New York, N. Y.
Master—Water heaters. Kehm Corp., The, Chicago, Ill.
Master Kraft—Oil burners. Harvey-Whipple, Inc., Springfield, Mass.
Master Pilot—Valves. Powell Co., Wm., Cincinnati, O.
McDaniel—Floats, traps. Watson & McDaniel Co., Philadelphia, Pa.
McKee—Blowers, boilers, burners, feeders, pumps, regulators, tanks, torches, valves. Eclipse Fuel Engineering Co., Rockford, Ill.
McKeesport—Radiation. Columbia Radiator Co., McKeesport, Pa.
McKnight—Registers. Tuttle & Bailey, Inc., New Britain, Conn.
Measurrench—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Meco—Torches, welding rod. Modern Engineering Co., St. Louis, Mo.
Medrae—Electric heating conductors. Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Melloblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Mel-Rock—Humidifiers, units, ventilators, washers. Mellish & Murray Co., Chicago, Ill.
Merrill Process—Heating systems. Parks-Cramer Co., Fitchburg, Mass.
Metal-Master—Shears. Wiss & Sons Co., J., Newark, N. J.
Metalprep—Compounds. Nielson Chemical Co., Detroit, Mich.
Metco—Ducts and duct fittings. Sheet Metal Mfg. Co., Inc., Brooklyn, N. Y.
Metermax—Combustion control systems. Leeds & Northrup Co., Philadelphia, Pa.
Metl-Tech—Doors and panels, metal sheets. Technical Ply-Woods, Chicago, Ill.
Metric—Meters. American Meter Co. Inc., New York, N. Y.
Metrotherm—Thermostats. General Controls Co., Glendale, Calif.
Micafil—Insulation Munn and Steele, Inc., Newark, N. J.
Mico—Insulation. Mineral Insulation Co., Chicago Ridge, Ill.
Micro—Low water cut-offs. Maid-O-Mist, Inc., Chicago, Ill.
Micro-Feed—Humidifiers. Cleveland Humidifier Co., Cleveland, O.
Micro-Klean—Filters. Cuno Engineering Corp., Meriden, Conn.
Micromax—Hygrometers, recorders, recorder-controllers, smoke alarms, thermometers. Leeds & Northrup Co., Philadelphia, Pa.
Micromet—Water treatment. Calgon Inc., Pittsburg, Pa.
MicroRold — Sheets. Washington Steel Corp., Washington, Pa.
Microstat—Thermostats. Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Microtherm—Thermostats. Barber-Colman Co., Rockford, Ill.
Microvac—Pumps. Stokes Machine Co., F. J., Philadelphia, Pa.
Microwax—Smoke alarms. Leeds & Northrup Co., Philadelphia, Pa.
Micro-Weld—Spot welders. Micro Products Co., Chicago, Ill.
Midget—Radiation. Utica Radiator Corp., Utica, N. Y.
Mighty Midget—Portable shears. Stanley Works, The, New Britain Conn.
Mighty Mite—Thermostats. Mechanical Industries Production Co., Akron, O.
Milcor—Doors and panels. Inland Steel Products Co., Milwaukee, Wis.
Milford—Tools, Thompson & Son Co., The Henry G., New Haven, Conn.
Mills—Boilers. Smith Co., Inc., H. B., The, Westfield, Mass.
Milvaco—Air eliminators, floats, strainers, traps, valves, Milwaukee Valve Co., Milwaukee, Wis.
Miracle Air—Window ventilator units. Reliable Sheet Metal Engineering Co., Chicago, Ill.
Miracle Red—Coatings. Debevoise Co., The, Brooklyn, N. Y.
Miracula—Air conditioning units. General Engineering & Mfg. Co., St. Louis, Mo.

Mir-O-Meter—Combustion control systems. Bowser, Inc., Fort Wayne, Ind.
Mirro-Matic—Heaters. Handley Brown Heater Co., Jackson, Mich.
Mirro-Shell—Heaters. Handley Brown Heater Co., Jackson, Mich.
Mixend—Electrodes. Arcos Corp., Philadelphia, Pa.
MKayO—Boilers. Mears-Kans-Ofeldt Inc., Philadelphia, Pa.
Model Star—Valves. Powell Co., Wm., Cincinnati, O.
Moderator—Heating System. Warren Webster Co., Camden, N. J.
ModernAire—Fans, unit air conditioners. National Gas Equipment Co., Inc., Terrell, Tex.
Moduflow—Control systems. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modustat—Valves. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modutrol—Heating systems. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modutron—Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mogul—Packing. Johns-Manville, New York, N. Y.
Mogul—Boiler cleaning compounds and water treatment. North American Fibre Products Co., The, Cleveland, O.
Mohawk—Pipe. Cohoes Rolling Mill Co., Cohoes, N. Y.
Moisturator—Humidifiers. Bridgeport Brass Co., Bridgeport, Conn.
Moncrief—Sheet metal pipe and fittings. Henry Furnace Co., The, Medina, O.
Monel—Pipe fittings, pipe, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Monend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
Mongol—Pipe joint cement and compounds. Baer Bros., New York, N. Y.
Monmouth—Filters, humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.
Mono-Block—Insulation. Baldwill-Hill Co., Trenton, N. J.
Mono-Cast—Pipe. American Cast Iron Pipe Co., Birmingham, Ala.
Monoflo—Hot water heating systems and fittings. Bell & Gossett Co., Morton Grove, Ill.
Mono-Line—Refractories. Quigley Co., Inc., New York, N. Y.
Mono-Peen—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Monovent—Ventilators. Burt Mfg. Co., Akron, O.
Monsoon—Fans, grilles, louvers. Jamieson Mfg. Co., Dallas, Texas.
Morpholine—Steam system treatment. Carbide & Carbon Chemicals Corp., New York, N. Y.
Morflex—Flexible couplings. Morse Chain Co., Ithaca, N. Y.
Mortairset—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Mortex—Protective coatings. Mortell Co., J. W., Kankakee, Ill.
Mortite—Caulking compounds, gaskets. Mortell Co., J. W., Kankakee, Ill.
Moto-Merco—Relays. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Motopump—Pumps. Yeomans Bros. Co., Chicago, Ill.
MotoReducer—Speed reducers. Philadelphia Gear Works, Inc., Philadelphia, Pa.
Motorstoker—Stokers. Hershey Machine & Foundry Co. Motorstoker Div., Manheim, Pa.
Motosteel—Valves. Taylor Instrument Companies, Rochester, N. Y.
Mototurb—Ventilators. Uno Ventilator Co., Cliftondale, Mass.
Mountain Stream—Water coolers. Refrigeration Engineering Corp., Philadelphia, Pa.
Muffletone—Insulation. Celotex Corp., The, Chicago, Ill.
Mule-Hide—Compounds. Lehon Co., The, Chicago, Ill.
Mullitex—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Mult-Au-Matic—Threading and boring machines. Bullard Co., The, Bridgeport, Conn.
Multiblade—Welding fume exhausters. General Blower Co., Chicago, Ill.
Multiclone—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.
Multi-Duty—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Multiduty—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.
Multifin—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Multiplane—Vibration isolating bases. Lord Mfg. Co., Erie, Pa.
Multiport—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Multiseal—Gaskets. Goetze Branch, Johns-Manville, New York, N. Y.
Multi-Seal—Bolts, repair plugs. Rolyan Metal Products, Chicago, Ill.
Multitherm—Air conditioning units. Clarage Fan Co., Kalamazoo, Mich.
Multi-V—V-belts. Goodrich Co., B. F., Akron, O.
Multi-V-Drive—Drives. Worthington Pump & Machinery Corp., Harrison, N. J.
Multivane—Fans, blowers, unit heaters. Westinghouse Electric Corp., Pittsburgh, Pa.
Multi-Vent—Ceiling panels. Pyle-National Co., The, Chicago, Ill.
Multi-Wash—Dust collectors. Schneible Co., Claude B., Detroit, Mich.
Murco—Aftercoolers, cooling towers, heat exchangers, unit heaters. Murray Mfg. Co., D. J., Wausau, Wis.
Murex—Welding electrodes. Metal & Thermit Corp., New York, N. Y.
Murray—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

NCG—Solder, torches, welding rod. National Cylinder Gas Co., Chicago, Ill.
N-M-D—Valves. Lunkenheimer Co., Cincinnati, O.
N-R—Condensers, heat exchangers. National Radiator Co., The, Johnstown, Pa.
NYBCo Steelfin—Heating surface. New York Blower Co., Chicago, Ill.
Nalco—Feeders, water treatment. National Aluminate Corp., Chicago, Ill.
National—Boilers, heaters. National Radiator Co., The, Johnstown, Pa.
National—Fans, furnaces, heaters. Magirl Foundry & Furnace Co., Bloomington, Ill.
National—Pumps. Austin-Mason Co., New York, N. Y.
National—Pipe, tubing. National Tube Co., United States Steel Corp., Subisdiary, Pittsburgh, Pa.
Natur Temp—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.
Naturzone—Insulation. Wilson & Co., Inc., Chicago, Ill.
Nelson—Stokers. Heating Assurance, Inc., Spokane, Wash.
Nemo—Insulating cement. Smith & Kanzler Corp., Elizabeth, N. J.
New Cyclone—Dust collectors. Kirk & Blum Mfg. Co., Cincinnati, O.
Newarc—Welding electrodes. Electric Arc, Inc., Newark, N. J.
Niagara—Meters. Buffalo Meter Co., Buffalo, N. Y.
Nibco—Fittings, joints, valves. Northern Indiana Brass Co., Elkhart, Ind.
Nibcoloy—Fittings, pipe, stainless steel. Northern Indiana Brass Co., Elkhart, Ind.
Nickelend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nickend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nicuend—Electrodes. Arcos Corp., Philadelphia, Pa.
No Drip—Insulation. J. W. Mortell Co., Kankakee, Ill.
Non-clog—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Non-clog—Pipe line strainers. Boylston Steam Specialty Co., Chicago, Ill.
Non-Clogging—Spray nozzles. Link-Belt Co., Chicago, Ill.
Non-Con-Dux—Cement, insulation. Wilson, Inc., Grant, Chicago, Ill.
Non-Frost—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Non-Sweat—Insulation. Keasbey & Mattison Co., Ambler, Pa.
No-Ox-Id—Protective coatings. Dearborn Chemical Co., Chicago, Ill.
Norblo—Dust collectors, fans. Northern Blower Co., Cleveland, O.
No-Rivet—Regulators, dampers. Ohio Products Co., Cleveland, O.
Northwestern—Water heaters. Coe Mfg. Co., Painesville, O.
Northwind—Unit air coolers. Pleasantaire Corp. of America, Washington, D. C.
Norwesco—Cement and compounds, boiler and radiator sealing compounds. Atlas Chemical Co., Marietta, O.
No Streak—Registers. Rock Island Register Co., Rock Island, Ill.
No-Thread—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
No-Vent—Pumps. Stout & Sons, David, St. Louis, Mo.
Novoid—Insulation. Cork Import Corp., Suburban Englewood, N. J.
Nox-Odor—Odor adsorber. Tamms Silica Co., Chicago, Ill.
Nu-Air—Fans, window ventilator units. Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Nu-Alpina—Ventilators. Inland Steel Products Co., Milwaukee, Wis.
Nu-Grip—Shears and snips. Wiss and Sons Co., J., Newark, N. J.
Nu-Notch—Mushroom ventilators. Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Nuvent—Ventilators. Aeolus Dickinson, Chicago, Ill.
Nu-Wood—Insulation. Wood Conversion Co., St. Paul, Minn.

OB—Valves. Ohio Brass Co., Mansfield, O.
O'B-Aid—Compounds. O'Brien Industries, Jersey City, N. J.
O'B-Col—Compounds. O'Brien Industries, Jersey City, N. J.
O'B-Ox—Water treatment. O'Brien Industries, Jersey City, N. J.
OCH—Filters. American Air Filter Co., Louisville, Ky.
OK—Motors. Marathon Electric Mfg. Corp., Wausau, Wis.
OK—Stocks and dies. Greenfield Tap & Die Corp., Greenfield, Mass.
Oakwood—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
O'Burnit—Soot destroyers. O'Brien Industries, Jersey City, N. J.
Octopus—Soot blowers, welding fume collectors. Chelsea Fan & Blower Co., Inc., Irvington, N. J.
Ofeldt—Boilers, superheaters. Mears-Kane-Ofeldt, Inc., Philadelphia, Pa.
Oilbuster—Boiler cleaning compounds. Cannon Chemical Co., Inc., Everett, Mass.
Oil-O-Matic—Oil burners. Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington Ill.
Oiltronic—Boilers, oil burners. Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Oilway—Oil fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Okay Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.
Ol' Faithful—Humidifiers. Maid-'O-Mist, Inc., Chicago, Ill.
One Venturi—Heating systems. Taco Heaters, Inc., New York, N. Y.
Orangeburg—Fiber pipe, conduit. Fibre Conduit Co., Orangeburg, N. Y.
Oriflex—Valves. Dunham Co., C. A., Chicago, Ill.
Oswego—Cutters, punches, wrenches. International Nutyp Tool Co., Oswego, N. Y.
Ovaltube—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Oxweld—Compounds, welding rod, welding and cutting apparatus. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Ozite—Insulation. American Hair & Felt Co., Chicago, Ill.

PC—Air conditioning units. Buffalo Forge Co., Buffalo, N. Y.
P-D—Pumps. Peters-Dalton, Inc., Detroit, Mich.
PD QC—Pipe machines. Bignall & Keeler Machine Works, Edwardsville, Ill.
P & H—Welding electrodes, arc welders. Harnischfeger Corp., Milwaukee, Wis.
P. I. V. Gear—Speed changers. Link-Belt Co., Philadelphia, Pa.
Paintgrip—Sheets. American Rolling Mill Co., The, Middletown, O.
Paladin—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Palco—Packing. Greene, Tweed & Co., North Wales, Pa.
Palco Wool-Saferized—Insulation. Pacific Lumber Co., The, San Francisco, Calif.
Palmaire—Furnaces, unit heaters. Palmer Mfg. Corp., Phoenix, Ariz.
Palmetto—Packing, cement and compounds. Greene, Tweed & Co., North Wales, Pa.
Palmetto Superheat—Gaskets and packing. Greene, Tweed & Co., North Wales, Pa.
Pan-L-Grid—Coils and panels. Pan-L-Heat Corp., Portland, Ore.
Par—Condensing units. Lynch Mfg. Corp., Toledo, O.
Paracoil—Coils, condensers, heaters, oil coolers, pipe nipples, preheaters, steam traps, water chillers. Davis Engineering Corp., Elizabeth, N. J.
Paraline—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Parasol—Spray nozzles. Spraying Systems Co., Chicago, Ill.
Parko — Psychrometers. Parks-Cramer Co., Fitchburg, Mass.
Pathfinder—Belting. Goodyear Tire & Rubber Co., Akron, O.
Pax-Tite—Leather packing. Watson-Stillman Co., Roselle, N. J.
Pedrifugal—Centrifugal pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Peer—Welders. Pier Equipment Mfg. Co., Benton Harbor, Mich.
Peerless—Humidifiers, air washers. New York Blower Co., Chicago, Ill.
Peerless—Pipe machines. Bignall & Keeler Machine Works, Edwardsville, Ill.
Peerless—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Pemco—Flue caps, nipples. Petroleum Equipment Mfg. Co., New Haven, Conn.
Penco—Plastic fittings, pipe. North Penn Co., New York, N. Y.
Penflex-Weld—Absorbers. Penflex Sales Co., Div. of Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Penn-M-Co—Fittings. Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Penn-Power—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Penn-Turbine—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Perco-Flash—Water heaters. Kresno-Stamm Mfg. Co., (America), Inc., Palisades Park, N. J.
Perfection—Electrodes. Carlin Co., Anthony, Cleveland, O.

Perfection—Hangers and supports. Iwan Brothers, Inc., South Bend, Ind.
Perfection—Plates. Beaton & Cadwell Mfg. Co., New Britain, Conn.
Perfection—Valves. American District Steam Co., North Tonawanda, N. Y.
Perfecto—Boiler ports. Green Fire Brick Co., Mexico, Mo.
PeroNite—Soot destroyers. Perolin Co., Inc., Chicago, Ill.
Petco—Insulating cement, chambers. Peterson Co., B. A., Dowagiac, Mich.
Petro—Oil burners, water heaters. Petroleum Heat & Power Co., Stamford, Conn.
Pexto—Brakes, punches, shears, wrenches, Peck, Stow & Wilcox Co., Southington, Conn.
Pilot—Fans, motors, Smith Mfg. Co., Inc., F. A., Rochester, N. Y.
Pilot—Valves. Powell Co., Wm., Cincinnati, O.
Pilotstat—Flame failure controls. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pipe Master—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Pipemaster—Wrenches. Erie Tool Wks., Erie, Pa.
Pipetite—Cements and compounds. Lake Chemical Co., Chicago, Ill.
Pitco—Unions. Pittsburgh Valve & Fittings Corp., Barberton, O.
Pittsburgh—Radiator, unit heaters. Automatic Gas Equipment Co., Pittsburgh, Pa.
Pittsburgh-National—Meters. Pittsburgh Equipable Meter Div., Rockwell Mfg. Co., Pittsburg Pa.
Planeweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Plasgon—Cement and compounds. Samuel Cabot, Inc., Boston, Mass.
Plasti-Calk—Caulking compounds. Chamberlin Co. of America, Detroit, Mich.
Plastikon—Caulking compounds. Goodrich Co., B. F., Akron, O.
Plastite—Caulking compounds. U. S. Stoneware Co., New York, N. Y.
Plastoid—Caulking compounds, furnace cement. Plastic Products Co., Detroit, Mich.
Platecoil—Coils. Kold-Hold Manufacturing Co., Lansing, Mich.
Playford—Stokers. Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Plexifin—Unit heaters. Bayley Blower Co., Milwaukee, Wis.
Plexiform—Fans. Bayley Blower Co., Milwaukee, Wis.
Plicast—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.
Plisulate—Insulating cement and insulation. Plibrico Jointless Firebrick Co., Chicago, Ill.
Plisorite—Pipe. Bridgeport Brass Co., Bridgeport, Conn.
Plymouth—Stokers. Clizbe Bros. Mfg. Co., Plymouth, Ind.
Ply-Tech—Plywood sheets and board. Technical Ply-Woods, Chicago, Ill.
Pneumatronic—Electronic and pneumatic temperature control equipment. Johnson Service Co., Milwaukee, Wis.
Poeco—Insulation. Poe Co., C. W., Cleveland, O.
Polartron—Relays, regulators, switches Minneapolis Honeywell Regulator Co., Minneapolis, Minn.
Polymerin—Protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Polymeroid—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Polytherm—Protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Poronze—Filters. Wabash Mfg. Co., Chicago, Ill.
Poro-Stone—Filters. Adams Co., Inc., R. P., Buffalo, N. Y.
Porto-Power—Pipe benders and pipe pushers. Blackhawk Mfg. Co., Milwaukee, Wis.
Porto-Shear—Shears. Van Dorn Electric Tool Co., Towson, Md.
Porto Shears—Shears. Black & Decker Mfg. Co., Towson, Md.
Portovent—Hose. American Ventilating Hose Co., New York N. Y.
Pottstown—Pumps. Lamson Corp., Syracuse, N. Y.
Power—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.
Power Boy—Pipe cutting and threading machines. Oster Mfg. Co., Cleveland, O.
Powerbilt—Fans, motors. Power Engineering Co., Chicago, Ill.
Powerflex—Flat belt drives. Gates Rubber Co., The, Denver, Colo.
Power-Flex—Stokers. Link-Belt Co., Chicago, Ill.
Powermaster—Boilers. Orr & Sembower, Inc., Reading, Pa.
Precipitron—Air cleaners. Westinghouse Electric Corp., Pittsburgh, Pa.
Premier—Welding rod. American Steel & Wire Co., United States Steel Corp. Sudsidiary, Cleveland, O.
Pre-Notch—Ducts and duct fittings. Gray Metal Products, Inc., Rochester, N. Y.
Pressuretrol—Regulators, switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Prestico—Caulking compounds, furnace cement, Presstite Engineering Co., St. Louis, Mo.
Prest-O-Lite—Leak detectors, torches. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Presto-Lock—Couplings. Drinkwater, Inc., Waukegan, Ill.
Prest-O-Weld—Welding and cutting apparatus. Linde Air Products Co., The, New York, N. Y.
Princo—Anemometers, gages, hygrometers, manometers, psychrometers, regulators, relays, thermometers, thermostats. Precision Thermometer and Instrument Co., Philadelphia, Pa.
Probestos—Gaskets. Goetze Branch, Johns-Manville, New York, N. Y.
Propeloflo—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Prop-R-Temp—Air conditioning units. Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., Brooklyn, N. Y.
Protectoglo—Controls. Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Protectomotor—Air filters. Dollinger Corp., Rochester, N. Y.
Protect-O-Ray—Lamps. Lustra Corp. of America, New York, N. Y.
Protectorelay—Flame failure controls, relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Protectoring—Gaskets. Goetze Branch, Johns-Manville, New York, N. Y.
Protex—Water treatment. Apex Engineering Co., Chicago, Ill.
Proxlin—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Pryzoak—Belting. Graton & Knight Co., Worcester, Mass.
Pul-Air—Ventilators. Lyon, Conklin & Co., Inc., Baltimore, Md.
Pul Air—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Pulling—Circulators, pumps. Columbus Steam Pump Works Co., Columbus, O.
Pulverzone—Stokers. American Coal Burner Co., Chicago, Ill.
Punkah—Louvers and shutters. Kelvin-White Co., Boston, Mass.
Pup—Valves. Fisher Governor Co., Marshalltown, Ia.
Puridryer—Dehumidifiers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Pur-O-Fiers—Separators. Goodyer Industries, Inc., Chicago, Ill.
Purox—Electrodes, welding and cutting apparatus. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Pyralux—Enamels and lacquers, du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept, Wilmington, Del.
Pyrex—Glass pipe, gage and sight glasses. Corning Glass Wks., Corning, N. Y.
Pyro—Thermometers, recorders, regulators. Pyrometer Instrument Co., New York, N. Y.
Pyrofax—Propane gas refrigerant. Carbide and Carbon Chemicals Corp., New York, N. Y.
Pyroflex—Coatings, lined pipes, tanks. Knight, Maurice A., Akron, O.
Pyromaster—Regulators. Bristol Co., The, Waterbury, Conn.
Pyrotron—Recorders. Bailey Meter Co., Cleveland, O.

QD—Sheaves. Worthington Pump & Machinery Corp., Harrison, N. J.
Q-T—Insulation. Celotex Corp., The, Chicago, Ill.
QT—Unit heaters. Kisco Boiler & Engineering Co., St. Louis, Mo.
Q-Chromastic—Refractories. Quigley Co., Inc., New York, N. Y.
Q-Chrome—Refractories. Quigley Co., Inc., New York, N. Y.
Q-Seal—Caulking compounds. Quigley Co., Inc., New York, N. Y.
Quad—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Quartzoid—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.
Quiet Zone—Blower wheels, fans. Palmer's Mfg. Corp., Phoenix, Ariz.

RBC—Roller bearings. Roller Bearing Co. of America, Trenton, N. J.
RB—Couplings. Link-Belt Co., Indianapolis, Ind.
RB Pressure—Pressure blowers. Western Blower Co., Seattle, Wash.
R & G—Grilles. registers. Register & Grille Mfg. Co., Brooklyn, N. Y.
R. I. 250—Unions. Rhode Island Fittings Co., Hillsgrove, R. I.
R-K—Combustion control systems, regulators, valves. Ruggles-Klingemann Mfg. Co., Salem, Mass.
R & M—Motors. Robbins & Myers, Inc., Springfield, O.
R-M—Packing. Raybestos-Manhattan, Inc., Passaic, N. J.
R & M Moyno—Pumps, Robbins & Myers, Inc., Springfield, O.
R. P. & C.—Fittings, valves. Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
R-U-F—Fans. Reed Unit-Fans, Inc., New Orleans, La.
RX—Coatings. Watson-Standard Co., Pittsburgh, Pa.
Race—Fans, heaters. Royal Heaters, Inc., Alhambra, Calif.
Radiafin—Finned tubing. Schutte & Koerting Co., Philadelphia, Pa.
Radialflow—Valves. Smolensky Valve Co., Inc., Bedford, O.
Radiant—Direct radiation. Burnham Corp., Boiler Div., Irvington, N. Y.
Radiantrol—Valves. Homestead Valve Mfg. Co., Coraopolis Pa.
Radiatherm—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Radi-Ion—Ionization apparatus. Montgomery Bros., San Francisco, Calif.
Radi-Vector—Radiation. Vulcan Radiator Co., Hartford, Conn.
Radolite—Cement, refractories. Pyrolite Products Co., Cleveland, O.
Rador—Temperature regulators. Vapor Car Heating Co., Inc., Chicago, Ill.
Raintite—Ventilators. Aeolus Dickinson, Chicago, Ill.
Rajah—Packing. Johns-Manville, New York, N. Y.
Ramapo—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Ramset—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Ranarex—Analyzers, indicators, recorders. Permutit Co., New York, N. Y.
Rapid—Oil coolers. Bell & Gossett Co., Morton Grove, Ill.
Rapiduction—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Ratosight—Alarms, flow switches. Fischer & Porter Co., Hatboro, Pa.
Rawl-Anchor—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Rawldrill—Drills for masonry. Rawlplug Co., Inc., The, New York, N. Y.
Rawl-Drive—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Raydiant—Radiation. Weil-McLain Co., Michigan City, Ind.
Rayduct—Pipe, Bethlehem Steel Co., Bethlehem, Pa.
Reco—Accumulators, condensers, headers, heaters, preheaters, tanks, unit coolers. Richmond Engineering Co., Richmond, Va.
Reco—Controllers and starters, motors, Reynolds Electric Co., Chicago, Ill.
Reco—Water chillers. Refrigeration Engineering Co., Philadelphia, Pa.
Reco-Radi-Aire—Fans. Reynolds Electric Co., Chicago, Ill.
Record-O-Stat—Recorder-controllers. Johnson Service Co., Milwaukee, Wis.
Recoy—Chillers, condensers, cooling surface, unit air conditioners and coolers. Refrigeration Economics Co., Inc., Canton, O.
Red—Compressors, controllers and starters, heaters, indicators, operators, regulators, switches, thermostats, valves. Cooper Co., Clark, Palmyra, N. J.
Red Devil—Furnace and pipe joint cement. Pecora Paint Co., Philadelphia, Pa.
Red Diamond—Pipe. American District Steam Co., North Tonawanda, N. Y.
Red-E-Haul—Portable machines. American Die & Tool Co., Inc., Reading Pa.
Red Flash—Traps. Ellis Drier Co., Chicago, Ill.
Red Head—Tongs. Billings & Spencer Co., Hartford, Conn.
Red Head—Traps. Ellis Drier Co., Chicago, Ill.
Redi—Stokers. General Machinery Co., Spokane, Wash.
Redi-Return—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Redi-Vac—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Red Reading Mercury—Hygrometers, psychrometers, themometers. Palmer Co., Cincinnati, O.
Red Seal—Engines. Continental Motors Corp., Muskegon, Mich.
Red Socket—Wrenches. Lowell Wrench Co., Worcester, Mass.
Red Top—Humidistats, thermostats. H-B Instrument Co., Philadelphia, Pa.
Red Top—Valves. Neptune Meter Co., New York, N. Y.
Red Top—Insulation. United States Gypsum Co., Chicago, Ill.
Reformend—Electrodes. Arcos Corp., Philadelphia, Pa.
Refrak Screen—Gas burners. Selas Corp. of America, Philadelphia, Pa.
Rego—Welding and cutting apparatus. Universal Power Corp., Cleveland, O.
Rego—Regulators, valves, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.
Relatrol—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Reliable—Preheaters. Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Reliance—Regulators. American Meter Co., Inc., New York, N. Y.
Remote—Indicators. Yarnall-Waring Co., Philadelphia, Pa.
Renewo—Valves. Lunkenheimer Co., Cincinnati, O.
Renu-Vent—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Research—Belting. Graton & Knight Co., Worcester, Mass.
Revolute—Blueprint machines. Paragon-Revolute Corp., Rochester, N. Y.
Revolving—Heaters. Wing Mfg. Co., L. J., New York, N. Y.
Revolving—Ventilators. Burt Mfg. Co., Akron, O.

Rex—Chain drives, coal and ash conveyors, couplings, nozzles, pillow blocks, pumps. Chain Belt Co., Milwaukee, Wis.
Rex—Fans, ventilators, wheels. Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Rexarc—Electrodes, welders. Sight Feed Generator Co., Richmond, Ind.
Rex-Flex—Ducts. Chicago Metal Hose Corp., Maywood, Ill.
Rex-Tube—Duct connections. Chicago Metal Hose Corp., Maywood, Ill.
Rexvane—Fans. Westinghouse Electric Corp., Pittsburgh, Pa.
Rex-Weld—Hose. Chicago Metal Hose Corp., Maywood, Ill.
Reyn-O-Cell—Insulation. Reynolds Metals Co., Richmond, Va.
Rhino—Caulking compounds. Pecora Paint Co., Philadelphia, Pa.
Richmond Heatomat—Heaters. Richmond Radiator Co., New York, N. Y.
Richvar—Radiation. Richmond Radiator Co., New York, N. Y.
Rid-Al—Cleaning compounds, water treatment. Apex Engineering Co., Chicago, Ill.
Ridgid—Pipe machines, wrenches, cutters, vises. Ridge Tool Co., Elyria, O.
Rid-Sludge — Cleaning compounds, corrosion treatment. Apex All Weather Products, Chicago, Ill.
Rifco 300—Unions. Rhode Island Fittings Co., Hillsgrove, R. I.
Riflex—Vibration absorbers. United Metal Hose Co., Inc., Long Island City, N. Y.
Rihco—Humidifiers. Rhode Island Humidifier & Ventilating Co., Boston, Mass.
Rincontrol—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Rip-pl—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Ripple-Fin—Cooling and heating surface. Mcquay, Inc., Minneapolis, Minn.
Robinson—Brakes, punches. New Albany Machine Mfg. Co., New Albany, Ind.
Robot-Eye—Regulators. General Power Plant Corp., New York City, N. Y.
Rocan—Copper sheets. Revere Copper and Brass, Incorporated, New York, N. Y.
Rockwell—Blast gates. Thermix Corp., The, Greenwich, Conn.
Rocop—Heaters. Rome-Turney Radiator Co., Rome, N. Y.
Rodpax—Packing. National Engineering Products, Inc., Washington, D. C.
Ro-Flo—Compressors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Rolagrip—Couplings. Gustin Bacon Mfg. Co., Kansas City, Mo.
Roll-a-Bend—Pipe benders. Radiant Devices, St. Louis, Mo.
Roman Bronze—Welding rod. Revere Copper and Brass Incorporated, New York, N. Y.
Roofvane—Ventilators. Westinghouse Electric Corp., Pittsburgh, Pa.
Roof-Vent—Ventilators. Reed Unit-Fans, Inc., New Orleans, La.
Rotameter—Flow meters. Schutte & Koerting Co., Philadelphia, Pa.
Rota-Roll—Pumps, fuel oil units. Sundstrand Machine Tool Co., Hydraulic Div., Rockford, Ill.
Rotary—Ventilators. Swartwout Co., Cleveland, O.
Roto Blast—Furnaces. Moncrief Furnace Co., Atlanta, Ga.
Roto-Clone—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.
Rotojet—Spray nozzles. Binks Mfg. Co., Chicago, Ill.
Roto-louvre—Dryers. Link-Belt Co., Chicago, Ill.
Roto-Torq—Tools. Richmont, Inc., Los Angeles, Calif.
Roto-trol — Liquid pressure regulators and switches. Healy Ruff Co., St. Paul, Minn.
Ro-Twin—Air compressors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Roxaprene—Protective coatings, enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Roxite—Pipe. United States Stoneware Co., New York, N. Y.
Roxyn C—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Royal—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Royal Clipper—Cutters and shears. C-B Tool Co., Lancaster, Pa.
Rubalt—Enamels and lacquers. Hague & Co., Alfred, Brooklyn, N. Y.
Rubatex—Insulation. Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Rubyfluid—Solder. Ruby Chemical Co., Columbus, O.
Rumaco—Circulators. Ruthman Machinery Co., Cincinnati, O.
Runwel—Packing. Greene, Tweed & Co., New York, N. Y.
Rusco—Insulation. Russell Co., F. C., The, Cleveland, O.
Rust Bloc No. 20—Coatings. Turco Products, Inc., Los Angeles, Calif.
Rust Evade—Coatings. Turco Products, Inc., Los Angeles, Calif.
Rust Raider—Compounds. Radiator Specialty Co., Charlotte, N. C.
Rust Veto—Protective Coatings. E. F. Houghton & Co., Philadelphia.
Rustbuster—Cleaning compounds. Cannon Chemical Co., Inc., Everett, Mass.
Rydlyme—Cleaning compounds. Apex Engineering Co., Chicago, Ill.

S-A—Conveyors, feeders. Stephens-Adamson Mfg. Co., Aurora, Ill.
SA—Valves. Lunkenheimer Co., Cincinnati, O.
S. C.—Air heaters, gas burners. Surface Combustion Corp., Toledo, O.
S.F.E.—Insulation. Standard Fuel Engineering Co., Detroit, Mich.
S-N—Air conditioning units, burners, fans, heaters, pumps, stokers. Scott-Newcomb, Inc., St. Louis, Mo.
SOH—Boilers. Titusville Iron Works Co., The, Titusville, Pa.
S & P—Burners, governors, preheaters, regulators, strainers, valves. Staples & Pfeiffer, San Francisco, Calif.
S. R. P.—Protective coatings. Sonneborn Sons, Inc., L., New York, N. Y.
Saco—Speed reducers. Stephens-Adamson Mfg. Co., Aurora, Ill.
Saf-Dry—Refrigerants. Liquid Carbonic Corp., The, Chicago, Ill.
Saftrol—Controls. Penn Electric Switch Co., Goshen, Ind.
Saint Louis—Stokers. Ormsby-Osterman, Inc., St. Louis, Mo.
Safe-T-Aire—Air sterilizing units. Hanovia Chemical & Mfg. Co., Newark, N. J.
Safety—Heaters. Wing Mfg. Co., L. J., New York, N. Y.
Sal-Mo—Cement, insulation, packing. Sall Mountain Co., Chicago, Ill.
Sanidaire—Humidifiers. United States Air Conditioning Corp., Minneapolis, Minn.
Santocel—Insulation. Monsanto Chemical Co., Merimac Div., Everett, Mass.
Santosite—Water treatment. Monsanto Chemical Co., St. Louis, Mo.
Santrol—Registers. Tuttle & Bailey, Inc., New Britain, Conn.
Saran—Plastic pipe and tubing. Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
Saunders—Pipe cutters. Erie Tool Works, Erie, Pa.
Saunders—Diaphragm valves. Grinnell Co., Inc., Providence, R. I.
Sauter—Time switches. Cramer Co., Inc., R. W., The, Centerbrook, Conn.
Schmidt—Torches. Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Schwan—Gas burners. Jamieson Mfg. Co., Dallas, Texas.
Scotch Giant—Refrigerating compressors. General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Scottie Jr.—Boilers. Kewanee Boiler Co., Kewanee, Ill.
Scroll-Pivoter—Shears. Wiss & Sons Co., J., Newark, N. J.
Scruin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Scru-peller—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Sealdflow—Cooling towers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Seal Master—Bearings. Stephens-Adamson Mfg. Co., Aurora, Ill.
Sealeak—Compounds. Ampion Corp., Long Island City, N. Y.
Seal-Rite—Cement and compounds. Macksons Co., New York, N. Y.
Searchray—X-ray machines. North American Philips Co., Inc., New York, N. Y.
Security—Caulking compounds. National Mfg. Corp., Tonawanda, N. Y.
Segweld—Pipe fittings. Gustin Bacon Mfg. Co., Kansas City, Mo.
Seismo-Dampers—Bases. Korfund Co., Inc., Long Island City, N. Y.
Selectair—Air conditioning units. Johnson Co., S. T., Philadelphia, Pa.
Selectric—Electric heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Selectrol—Regulators. Automatic Control Co., St. Paul, Minn.
Sells—Bearings. Royersford Foundry & Machine Co., Royersford, Pa.
Sensaire—Air conditioning units. American Coils Co., Newark, N. J.
Sensatherm—Thermostats. Mercoid Corp., Chicago, Ill.
Sensitrol—Relays. Weston Electrical Instrument Corp., Newark, N. J.
Sentinel—Pumps. Red Jacket Mfg. Co., Davenport, Ia.
Sentry — Draft controls, draft regulators. Krueger Sentry Gauge Co., Green Bay, Wis.
Serrabestos—Gaskets. Goetze Branch, Johns-Manville, New York, N. Y.
Service—Packing. Johns-Manville, New York, N. Y.
Servicecoat—Enamels and lacquers. Debevoise Co., The, Brooklyn, N. Y.
Serviron—Coatings. Saverite Engineering Co., Hoboken, N. J.
Sesure—Gages. Yarnall-Waring Co., Philadelphia, Pa.
"77"—Pipe coverings. Eagle-Picher Co., Cincinnati, O.
Shawco—Bends, headers. Shaw Co., Benjamin F., Wilmington, Del.
Sheetrock—Sheets and board for ducts. United States Gypsum Co., Chicago, Ill.
Shelby—Tubing. National Tube Co., United States Steel Corp. Sub., Pittsburgh, Pa.
Shield-Arc—Electrodes, arc welders. Lincoln Electric Co., Cleveland, O.
Shone—Sewage ejectors. Yeomans Bros. Co., Chicago, Ill.
Shuntflo—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Shutlbrak—Switches. Adam Electric Co., Frank, St. Louis, Mo.
Shut-O-Vent—Louvers and shutters. Reed Unit-Fans, Inc., New Orleans, La.
Sierra-Air—Air conditioning units. International Sales Co., San Francisco, Calif.
Silastic—Compounds, packing. Dow Corning Corp., Midland, Mich.
Silent-Auburn—Burners, heaters, air conditioning units. Auburn Burner Co., Auburn, Ind.
Silentblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Silent-Breeze—Propeller fans. Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Silent Korth—Air conditioning units, burners. Eckhart Mfg. Co., Roselle, N. J.
Silentvane—Fans. Westinghouse Electric Corp., Pittsburgh, Pa.
Sil-Fos—Solder. Handy & Harman, New York, N. Y.
Silicair—Insulation. Western Silicair Products, Inc., Burbank, Calif.
Silimite—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Silverlink—Chain drives. Link-Belt Co., Indianapolis, Ind.
Silver Magic—Welding compounds. Universal Power Corp., Cleveland, O.
Silverstreak—Chain drive. Link-Belt Co., Indianapolis, Ind.
Silver Stream—Spray nozzles. Skinner Irrigation Co., Troy, O.
Silvertop—Eliminators, traps. Anderson Co., V. D., The, Cleveland, O.
Simplex—Gages. Viking Pump Co., Cedar Falls, Ia.
Simplex—Regulators, tanks. Bell & Gossett Co., Morton Grove, Ill.
Sim-Trol—Controls. Simplex Mfg. Co., Fond du Lac, Wis.
Sioux—Electric drills. Albertson & Co., Inc., Sioux City, Ia.
Sirocco—Blowers. American Blower Corp., Detroit, Mich.
Skip-Tooth—Dies. Nye Tool & Machine Co., Chicago, Ill.
Slenderized—Direct radiation. Burnham Corp., Boiler Div., Irvington, N. Y.
Slo-Speed—Reducers. Sterling Electric Motors, Inc., Los Angeles, Calif.
Slugin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Smith-Dolan—Electric preheaters and stress relievers. Electric Arc, Inc., Newark, N. J.
Smith-Mills—Boilers. Smith Co., Inc., H. B., Westfield, Mass.
Smokotrol—Smoke alarms. Power Engineering Co., Chicago, Ill.
Snap-Rite—Ducts and duct fittings. Gray Metal Products, Inc., Rochester, N. Y.
Sno-Breeze—Air conditioning units, cooling surface. Palmer Mfg. Corp., Phoenix, Ariz.
Softweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Solray—Radiation. Weil-McLain Co., Michigan City, Ind.
Sol-vet—Cleaning compounds, water treatment. Anderson-Stolz Corp., Kansas City, Mo.
Sono-O-Seal—Insulation. General Insulating Products Co., Brooklyn, N. Y.
So-Salts—Solder. Turco Products, Inc., Los Angeles, Calif.
Soundliner—Insulation. Baldwin-Hill Co., Trenton, N. J.
Sovabead—Dehumidifiers. Socony Vacuum Oil Co., Inc., New York, N. Y.
Sovereign—Packing. Darcoid Co., Inc., New York, N. Y.
Spatter Nox—Welding compounds. Universal Power Corp., Cleveland, O.
Spatter Off—Welding compounds. Universal Power Corp., Cleveland, O.
Spartan—Packing. Graton & Knight Co., Worcester, Mass.
Spekaluminite — Coatings. Special Chemicals Corp., New York, N. Y.
Special X—Solder. Industrial Service Laboratories, Milwaukee, Wis.
Spee-Dee—Blue print and white print machines. Peck & Harvey, Chicago, Ill.
Speed Clamps—Hose clamps. Tinnerman Products, Inc., Cleveland, O.
Speed-Flex—Flat belt drives. Gates Rubber Co., The, Denver, Colo.
Speed Heater—Unit heaters. Westinghouse Electric Corp., Pittsburgh, Pa.
Speed-Jack—Changers. The American Pulley Co., Philadelphia, Pa.
Speed Nuts—Locknuts. Tinnerman Products, Inc., Cleveland, O.
Speed-Trol—Changers. Sterling Electric Motors, Inc., Los Angeles, Calif.
Speed Prime—Pumps. Chain Belt Co., Milwaukee, Wis.
Speedarc—Electrodes. Universal Power Corp., Cleveland, O.
Speedweld—Electrodes. Trindl Products, Ltd., Chicago, Ill.
Speedylectric—Boilers. Livingstone Engineering Co., Boston, Mass.

Sphero—Blow-off valves. Fairbanks Co., New York, N. Y.

Spinner—Ventilators. Inland Steel Products Co., Milwaukee, Wis.

Spiralock—Pipe coils, tubing. B & M Mfg. Co., East Orange, N. J.

Spiralock—Pulleys and sheaves. Scientiae Tool Co., Dayton, Ohio.

Spiratube—Ducts and duct fittings, hose. Warner Bros. Co., Spiratube Div., Bridgeport, Conn.

Spiraweld—Pipes. Naylor Pipe Co., Chicago, Ill.

Spiro—Heaters. Stout & Sons, David, St. Louis, Mo.

Spirodome—Spray nozzles. Cooling Tower Co., Inc., The, Div. of the Fluor Corp., Ltd., New York, N. Y.

Spirodome—Spray nozzles. Fluor Corp., Ltd., The, Los Angeles, Calif.

Spirotallic—Gaskets. Goetze Branch, Johns-Manville, New York, N. Y.

Spirovane—Fans. Western Blower Co., Seattle, Wash.

Spraco—Booths, nozzles, separators, strainers, washers. Spray Engineering Co., Somerville, Mass.

Spra-Rite—Nozzles. Binks Mfg. Co., Chicago, Ill.

Spray-Acoustic—Insulation. Sprayo Flake Co., Chicago, Ill.

Square-Heat—Boilers. Kewanee Boiler Corp., Kewanee, Ill.

Stabilflo—Valves. Foxboro Co., Foxboro, Mass.

Stacon—Regulators, valves. Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.

Sta-Gloss—Steel sheets. Jessop Steel Co., Washington, Pa.

Staidarc—Electrodes. Universal Power Corp., Cleveland, O.

Stainarc—Electrodes. Universal Power Corp., Cleveland, O.

Stainlend—Electrodes. Arcos Corp., Philadelphia, Pa.

Stainless—Cement and compounds. Grinnell Co., Inc., Providence, R. I.

Stainweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Standard—Ventilators. Burt Mfg. Co., Akron, O.

Standco—Bearings. Standard Pressed Steel Co., Jenkintown, Pa.

Standforated—Grilles. Standard Stamping & Perforating Co., Chicago, Ill.

Star—Ventilators. Merchant & Evans Co., Philadelphia, Pa.

Starbird—Pressure and vacuum switches. Meletron Corp., Los Angeles, Calif.

Statick—Ventilators. Hirschman-Pohle Co., Inc., Le Roy, N. Y.

Staxauster—Roof ventilators. Production Planning Co., Rochester, Mich.

Staynew—Filters. Dollinger Corp., Rochester, N. Y.

Stazin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Steam-Pak—Steam generator unit. York-Shipley, Inc., Industrial Div., York, Pa.

Sterilamp—Lamps. Westinghouse Electgic Corp., Pittsburgh, Pa.

Sterlco—Controls, pumps, strainers, heating systems, regulators, traps, valves. Sterling, Inc., Milwaukee, Wis.

Sterling—Compressors, condensers, valves. Reynolds Mfg. Co., Inc., Springfield, Mo.

Stictite—Cement. Refractory & Insulation Corp., New York, N. Y.

Stillson—Pipe wrenches. Erie Tool Works, Erie, Pa.

Stilphen—Fans. Howry-Berg Steel & Iron Works, Denver, Colo.

Stok-A-Fire—Stokers. Automatic Firing Corp., St. Louis, Mo.

Stokerator—Stokers. Northern Steel & Stoker Corp., Peoria, Ill.

Stokerelay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Storm Shade—Windows. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.

Streamaire—Unit heaters, radiation, cooling surface. Young Radiator Co., Racine, Wis.

Steamjet—Spray nozzles. Spraying Systems Co., Chicago, Ill.

Strahman—Boiler gage cocks. Klingerit Inc., New York, N. Y.

Streamline—Couplings, cutters, fittings, heat exchangers, manifolds, nipples, pipe, strainers, tubing, unions, valves. Mueller Brass Co., Port Huron, Mich.

Stronghold—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.

Stud-Pak—Insulation. United States Mineral Wool Co., South Milwaukee, Wis.

Sturdybender—Power brakes. Bath Co., Cyril, The, Cleveland, O.

Submersion—Boilers, water heaters. Stout & Sons, David, St. Louis, Mo.

Sullarc—Electrodes. Universal Power Corp., Cleveland, O.

Sullivan—Controls. Cole-Sewell Engineering Co., St. Paul, Minn.

Sunrad—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Super—Insulating cement. Union Asbestos & Rubber Co., Cicero, Ill.

Super Air Screws—Fans. Marathon Electric Mfg. Corp., Wausau, Wis.

Super "66"—Insulation. Eagle-Picher Co., Cincinnati, O.

Super 7—V belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Super Silvertop—Traps. Anderson Co., V. D., The, Cleveland, O.

Super Thermo Stucco—Cement. Chicago Fire Brick Co., Chicago, Ill.

Super X—Sheets. Western Brass Div. of Olin Industries, Inc., East Alton, Ill.

Super X—Coatings. Nelson Mfg. Co., B. F., Minneapolis, Minn.

Supercord—V belts. Browning Mfg. Co., Inc., Maysville, Ky.

Supercutno—Packing. Greene, Tweed & Co., North Wales, Pa.

Super-deLavaud—Pipe. U. S. Pipe & Foundry Co., Burlington, N. J.

Superector—Wrenches. Williams & Co., J. H., Buffalo, N. Y.

Superex—Insulation. Johns-Manville, New York, N. Y.

Super-Fan—Fan blades. Norwin Co., Freeport, Ill.

SuperFex—Furnaces, heaters. Perfection Stove Co., Cleveland, O.

Superflex—Drives. Gates Rubber Co., The, Denver, Colo.

Superflux—Solder. Paul-Lewis Laboratories, Inc., Milwaukee, Wis.

Superheat—Gas burners. Selas Corp. of America, Philadelphia, Pa.

Superior—Fans. American Foundry & Furnace Co., Bloomington, Ill.

Superior—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.

Superior—Wrenches. Williams & Co., J. H., Buffalo, N. Y.

Superjustable—Adjustable wrenches. Williams & Co., J. H., Buffalo, N. Y.

Super-Power—Drives. Baldwin Belting, Inc., New York, N. Y.

Superratchet—Ratchet wrenches. Williams & Co., J. H., Buffalo, N. Y.

Superrench—Wrenches. Williams & Co., J. H., Buffalo, N. Y.

Super-S—Gages. Klingerit, Inc., New York, N. Y.

Superseal—Fittings. Grinnell Co., Inc., Providence, R. I.

Supersocket—Wrenches. Williams & Co., J. H., Buffalo, N. Y.

Supertan—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.

Supertemp—Insulation. Eagle-Picher Co., Cincinnati, O.

Sure Return—Condensation return pumps. Chicago Pump Co., Chicago, Ill.

Surevent—Valves. Gorton Heating Corp., Cranford, N. J.

Sureweld—Electrodes, welders. National Cylinder Gas Co., Chicago, Ill.

Swendeman—Air separators. Leavitt Machine Co., Orange, Mass.

Sylphon—Bellows, joints, operators, regulators, valves. Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.

Synchro—Valves. The Bristol Co., Waterbury, Conn.

Synchro-Lectric—Viscosimeters. Brookfield Engineering Laboratories, Sharon, Mass.

Synchro-Meter—Meters. Bailey Meter Co., Cleveland, O.

Synchron—Motors. Hansen Mfg. Co., Inc., Princeton, Ind.

Synchrotie—Recorders. Westinghouse Electric Corp., Pittsburgh, Pa.

Syncretizer—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.

Syncrogear—Speed reducers. U. S. Electrical Motors, Inc., Los Angeles, Calif.

Syndolag—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

Syphonaire—Ventilators. Western Engineering & Mfg. Co., Los Angeles, Calif.

T.T.—Smoke guns. Hill, E. Vernon, Chicago, Ill.

Tabasco—Water heaters. Kewanee Boiler Corp., Kewanee, Ill.

Tag—Humidistats, hygrometers, manometers, meters, psychrometers, recorders, regulators, thermometers, valves. Tagliabue Div., C. J. Portable Products Corp., Brooklyn, N. Y.

Tampico—Air filters. Chicago Filter Co., Joliet, Ill.

Tampin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Tank-Kleen—Soot destroyers. Celco Corp., New York, N. Y.

Tank-O-Meter—Gages, indicator-controllers, indicators. Uehling Instrument Co., Paterson, N. J.

Tanktrol—Regulators. Automatic Control Co., St. Paul, Minn.

Tannate—Belting, packing. Rhoads & Sons, J. E., Philadelphia, Pa.

Tannate-Rockwood—Belt drives. Rhoads & Sons, J. E., Philadelphia, Pa.

Telemaster—Relays. Tork Clock Co., Inc., Mt. Vernon, N. Y.

Televisor—Gages. Schutte & Koerting Co., Philadelphia, Pa.

Tellevel—Indicators, switches. Stephens-Adamson Mfg. Co., Aurora, Ill.

Teltru—Anemometers, gages. Hill, E. Vernon, Chicago, Ill.

Tem-Clock (Electric)—Time switches. Penn Electric Switch Co., Goshen, Ind.

Temperator—Unit air conditioners. Dunham Co., C. A., Chicago, Ill.

Tempotool—Tools. Tempo Products Co., Cleveland, O.

Temprytе—Windows. Trucson Steel Co., Youngstown, O.

Temptrol—Insulation. Badham Insulation Co., Inc., Birmingham, Ala.

Tempscribe—Recorders. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

Temtrol—Thermostats. Penn Electric Switch Co., Goshen, Ind.

Tensulate—Cement, insulation. Tennessee Products and Chemical Corp., Nashville, Tenn.

Texrope—V-belt drives, pulleys, v-belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Texslide—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Texsteel—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Textolite—Insulation, tubing. General Electric Co., Chemical Dept., Pittsfield, Mass.

Thag—Air heaters. Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.

Tharco—Cement. The Armstrong Co., Detroit, Mich.

Thawzone—Dehydrant and acid neutralizer. Highside Chemicals Co., Newark, N. J.

Therhumiter—Thermometers. Weksler Thermometer Corp., New York, N. Y.

Thermalfin—Unit coolers. Thermal Co., Inc., Milwaukee, Wis.

Thermafuel—Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.

Thermascrete—Refractories. Munn and Steele, Inc., Newark, N. J.

Therm-Cote—Radiation. Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.

Thermek—Heating and cooling surface. Peerless of America, Inc., Chicago, Ill.

Thermidaire—Burners, furnaces, heaters. Campbell Heating Co., E. K., Kansas City, Mo.

Thermix—Dust collectors, fans, heat exchangers. Prat-Daniel Corp., Port Chester, N. Y.

Thermo—Expansion valves. Alco Valve Co., St. Louis, Mo.

Thermo—Heaters. American Furnace Co., St. Louis, Mo.

Thermochek—Controls. Bell & Gossett Co., Morton Grove, Ill.

Thermo-Draulik—Operators, regulators. Perfex Corp., Milwaukee, Wis.

Thermodrive—Speedchangers, pulleys and sheaves. Webster Electric Co., Racine, Wis.

Thermoflex—Strainers, heating systems, radiator orifices, traps, valves. Cashin Co., W. D., Boston, Mass.

Thermoflo—Valves. Bell & Gossett Co., Morton Grove, Ill.

Thermo-Flow—Heat exchangers. Thermal Industries, Indio, Calif.

Thermogage—Thermometers. Hotstream Heater Co., Cleveland, O.

Thermogas—Furnaces, duct and unit heaters. Beck Engineering Combustion Kompany, St. Louis, Mo.

Thermo Grip—Torches. Ideal Industries, Inc., Sycamore, Ill.

Thermoguide—Thermometers. Taylor Instrument Companies, Rochester, N. Y.

Thermo-Humidigraph — Recorder-controllers. Bristol Co., The, Waterbury, Conn.

Thermoil—Furnaces, unit heaters. Beck Engineering Combustion Kompany, St. Louis, Mo.

Thermolator—Valves. Triplex Heating Specialty Co., Inc., Peru, Ind.

Thermolier—Unit heaters. Grinnell Co., Inc., Providence, R. I.

Thermo-Limit—Valves. Alco Valve Co., St. Louis, Mo.

Thermopane — Windows. Libbey-Owens-Ford Glass Co., Toledo, O.

Therm-o-tile—Conduit. Porter & Co., Inc., H. W., Newark, N. J.

Thermotrol—Valves. Sterling Engineering Co., Milwaukee, Wis.

Therm-otrols—Thermometers. Wheelco Instruments Co., Chicago, Ill.

Thermovent—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.

Thermovoir—Water heaters. Bell & Gossett Co., Morton Grove, Ill.

Thin Man—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Thor—Belting. Goodyear Tire & Rubber Co., Akron, O.

Thor—Drills, pumps, reamers, shears, valve reseaters. Independent Pneumatic Tool Co., Chicago, Ill.

Thorobred—V belts and v belt drives. Dayton Rubber Co., Dayton, O.

Thread King—Portable machines. Century Engineering Co., Los Angeles, Calif.

Thredolets—Fittings. Bonney Forge & Tool Wks., Allentown Pa.

3C—Motor controls. Clark Controller Co., Cleveland, O.

Thrift—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

Throway—Air filters. American Air Filter Co., Inc., Louisville, Ky.

Thur-Ma-Lox—Coatings. Dampney Co. of America, Hyde Park, Boston, Mass.

Ticotherm—Boilers. Titusville Iron Works Co., The, Titusville, Pa.

Tilco-Fin—Heating and cooling surface, finned tubing. Extended Surface Div. of David E. Kennedy, Inc., Brooklyn, N. Y.

Tilt Trap—Steam traps. Nason Co., Detroit, Mich.

Time Saver—Damper regulators. Goese Mfg. Co., Milwaukee, Wis.

Timercoid—Time switches. Mercoid Corp., Chicago, Ill.
Timerelay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Timetrol (Manual)—Time switches. Penn Electric Switch Co., Goshen, Ind.
Tin-Ezy—Coatings, solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Tin-Loy—Solder. Eagle-Picher Co., Cincinnati, O.
Tiny—Traps. Nason Co., Detroit, Mich.
Titan—Traps. Nason Co., Detroit, Mich.
Tite—Caulking compounds. Krehbiel Co., J. H., Chicago, Ill.
Tite Seal—Cement and compounds. Radiator Specialty Co., Charlotte, N. C.
Tom Thumb—Pipe machines. Oster Mfg. Co., Cleveland, O.
Toolarc—Electrodes. Universal Power Corp., Cleveland, O.
Toolweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Torchweld—Regulators, valves, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.
Torkflash—Wrenches. Blackhawk Mfg. Co., Milwaukee, Wis.
Torkotherm—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Torpedo—Dehydrators, filters. Imperial Brass Mfg. Co., Chicago, Ill.
Torqometer—Torque indicating wrenches. Snap-On Tools Corp., Kenosha, Wis.
Torq-Stop—Wrenches. Richmont, Inc., Los Angeles, Calif.
Trace—Refrigerant leak detectors. Highside Chemicals Co., Newark, N. J.
Transaxil—Flame failure controls. Mettler Co., Lee B., Los Angeles, Calif.
Transflex—Plastic tubing. Irvington Varnish and Insulator Co., Irvington, N. J.
Transite—Conduit, pipe, refractories, sheets and board. Johns-Manville, New York, N. Y.
Transparent — Analyzers, gages, manometers. Dwyer Mfg. Co., F. W., Chicago, Ill.
Trap-Dri—Dehydrators. Automatic Products Co., Milwaukee, Wis.
Trap-it—Filters. Automatic Products Co., Milwaukee, Wis.
Trap Nest—Insulation. Wilson, Inc., Grant, Chicago, Ill.
Tray—Cooling towers. New England Cooling Tower Co., Boston, Mass.
Treet-O-Control—Steam system and water treatment. % Proportioneers, Inc. %, Providence, R. I.
Treet-O-Unit—Feeders, pumps. % Proportioneers, Inc. %, Providence, R. I.
Trentweld—Tubing. Trent Tube Mfg. Co., East Troy, Wis.
Triad—Stocks and dies. Nye Tool & Machine Co., Chicago, Ill.
Tri-Clad—Motors. General Electric Co., Apparatus Dept., Schenectady, N. Y.
Trident—Meters. Neptune Meter Co., New York, N. Y.
Tri-Flex—Registers, grilles. Tuttle & Bailey, Inc., New Britain, Conn.
Tri-Flux—Solder. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Trimo—Cutters, tongs, vises, wrenches. Trimount Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Trimo—Cutters. Erie Toolworks, Erie, Pa.
Trimtherm—Thermostats. General Controls Co., Glendale, Calif.
Triple-A—Enamels and lacquers, protective coatings. Quigley Co., Inc., New York, N. Y.
Triple Duty—Heating systems. Bell & Gossett Co., Morton Grove, Ill.
Triple-Seal—Fittings. Imperial Brass Mfg. Co., Chicago, Ill.
Triplex—Stocks and dies. Nye Tool & Machine Co., Chicago, Ill.
Tripl-Mix—Cement. Krehbiel Co., J. H., Chicago, Ill.
Tri-Rotor—Pumps. Yale & Towne Mfg. Co., Stamford, Conn.
Tri-trol — Regulators, switches, thermostats. Marsh Heating Equipment Co., Chicago, Ill.
Triumph—Gaskets. Goetze Branch, Johns-Manville, New York, N. Y.
Triumph—Liquid level gages and indicators. Boston Auto Gage Co., Pittsfield, Mass.
Trojan—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Trojan—Stokers. Auburn Burner Co., Auburn, Ind.
Tropelite—Coatings. Tropical Paint & Oil Co., Cleveland, O.
Tropic-Breeze—Air conditioning units. Dalzen Tool & Mfg. Co., Detroit, Mich.
Tru-Air—Air conditioning units. Blazer, M., & Son, Passaic, N. J.
Truflex—Bi-metals. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Truliradiant—Gas burners. Sullivan Valve & Engineering Co., Butte, Mont.
Trumark—Protractor for marking pipe. Tru-Line Corp., Los Angeles, Calif.
Try-Me—Regulators, strainers, valves. Tryco Products, Inc., Westfield, Mass.
Tubejet—Compressors, ejector type vacuum pump. Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Tube Master—Flaring tools. Leonard Precision Products Co., Garden Grove, Calif.
Tuf-flex—Gage and sight glasses. Libbey-Owens-Ford Glass Co., Toledo, O.
Tuf-On—Protective coatings. Brooklyn Varnish Mfg. Co., Brooklyn, N. Y.
Tuff-Bond—Compounds. Moore Co., Goodloe E., Danville, Ill.
Tuff-Cote—Adhesives, cement. Moore Co., Goodloe E., Danville, Ill.
Tulox—Plastic pipe and tubing. Extruded Plastics, Inc., Norwalk, Conn.
Turbine Driven—Heaters. Wing Mfg. Co., L. J., New York, N. Y.
Turbo—Air washers, spray nozzles. Bayley Blower Co., Milwaukee, Wis.
Turbo Vane—Fans and blowers. Westinghouse Electric Corp., Pittsburgh, Pa.
Turbulaire — Dryers. Western Precipitation Corp., Los Angeles, Calif.
Turret—Pumps. Yeomans Bros. Co., Chicago, Ill.
Tuway—Strainers. Wright-Austin Co., Detroit, Mich.
20th Century—Bearings. Roller Bearing Co., of America, Trenton, N. J.
Twin Contact—Controls, switches, thermostats. Perfex Corp., Milwaukee, Wis.
Twin G-Fin—Preheaters. Griscom-Russell Co., The, New York, N. Y.
Twin Seal—Check valves, gage testers. Mansfield & Green, Cleveland, O.
Twindow—Heat insulating windows. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Two Way—Dampers. Tuttle & Bailey, Inc., New Britain, Conn.
Tygon—Protective coatings, plastic tubing. U. S. Stoneware Co., New York, N. Y.
Tylox—Pipe couplings. United States Stoneware Co., New York, N. Y.
Tymit—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Tytecote—Insulation. Specialty Converters, Inc., East Braintree, Mass.

U. F. S.—Clamps. Grinnell Co., Inc., Providence, R. I.
U. S.—Valves, Powell Co., Wm., Cincinnati, O.
US-Capitol—Boilers, hangers or brackets, heaters, radiation. United States Radiator Corp., Detroit, Mich.
US-Capitolaire—Furnaces, air conditioning units. United States Radiator Corp., Detroit, Mich.
USG—Louvers and shutters. United States Gypsum Co., Chicago, Ill.
U. S. S.—Angles, sheets. Carnegie-Illinois Steel Corp., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
U. S. S.—Pipe, tubing. National Tube Co., United States Steel Corp., Subsidiary, Pittsburgh, Pa.
U-S-S—Shapes, sheets. Columbia Steel Co., United States Steel Corp., Subsidiary, San Francisco, Calif.
USS—Sheets, structural shapes. Tennessee Coal, Iron & Railroad Co., United States Steel Corp. Subsidiary, Birmingham, Ala.
usAIRco—Air conditioning equipment, blowers, condensers, fans, grilles, heaters. United States Air Conditioning Corp., Minneapolis, Minn.
UTA—Pumps. American-Marsh pumps, Inc., Battle Creek, Mich.
Ugasco—Gaskets. United States Gasket Co., Camden, N. J.
U-Loy—Sheets. Republic Steel Corp., Cleveland, O.
Unaflo—Steam engines. Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.
Unamatic—Automatic arc welding equipment. Una Welding, Inc., Cleveland, O.
Unarco—Insulation. Union Asbestos & Rubber Co., Cicero, Ill.
Unibestos—Insulation. Union Asbestos & Rubber Co., Cicero, Ill.
Unichrome—Enamels and lacquers. United Chromium, Inc., New York, N. Y.
Unicoils—Air conditioning unit. Clarage Fan Co., Kalamazoo, Mich.
Uniduct—Ducts and duct fittings. General Corporation, Minneapolis, Minn.
Uni-fin—Air diffusers, dampers, grilles, registers. Barber-Colman Co., Rockford, Ill.
Uniflare—Fittings. Brockway Co., Naugatuck, Conn.
Uniflex—Metal hose. Brockway Co., Naugatuck, Conn.
Uniflow—Oil burners. Ace Engineering Co., Chicago, Ill.
Union—Valves. Powell Co., Wm., Cincinnati, O.
Unipack—Welding fume exhausters, centrifugal fans. American Machine Products Co., Marshalltown, Ia.
Uniplastic—Furnace and insulating cement, insulation. Robinson Insulation Co., Great Falls, Mont.
Unishears—Electric shears. Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Unisorb—Bases and pads, gaskets, insulation. Felters Company, The, Boston, Mass.
Unitaire—Air conditioning units. Westinghouse Electric Corp., Pittsburgh, Pa.
Unitem—Heaters. Bell & Gossett Co., Morton Grove, Ill.
Unitherm—Unit heaters and coolers. Clarage Fan Co., Kalamazoo, Mich.
Unitrol — Regulators, switches, thermostats. Marsh Tritrol Co., Chicago, Ill.
Unitrol—Valves. Kieley & Mueller, Inc., North Bergen, N. J.
Universal—Benders. Hossfeld Mfg. Co., Winona, Minn.
Universal—Burners. Dalzen Tool & Mfg. Co., Detroit, Mich.
Universal—Cast iron pipe. Central Foundry Co., New York, N. Y.
Universal—Centrifugal pumps. Bell & Gossett Co., Morton Grove, Ill.
Universal—Gas and oil burners. Mettler Co., Lee B., Los Angeles, Calif.
Universal—Packing. Johns-Manville, New York, N. Y.
Universal—Pipe cutters. Nye Tool & Machine Co., Chicago, Ill.
Universal—Regulators. Dockson Corp., Detroit, Mich.
Universal Unaflow—Engines. Skinner Engine Co., Erie, Pa.
Upson—Bolts and studs. Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Utility—Blowers. American Blower Corp., Detroit, Mich.
Utility—Compressors. Schramm, Inc., West Chester, Pa.
Utility—Heaters. Wing Mfg. Co., L. J., New York, N. Y.

V*S—Changers. Reliance Electric & Engineering Co., Cleveland, O.
Vac-Airid—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Vacuumstat—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Vad—Cooling towers. Young Radiator Co., Racine, Wis.
Valcalox—Damper regulators. Young Regulator Co., Cleveland, O.
Valdura—Caulking compound, rubber base enamel. American-Marietta Co., Chicago, Ill.
Valpit—Unions. Pittsburgh Valve & Fittings Corp., Barberton, O.
Valvactor—Valve operators. Foxboro Co., Foxboro, Mass.
Valvrator—Valves. Fischer & Porter Co., Hatboro, Pa.
Vaporene—Corrosion inhibition. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Vaporstat — Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Varidrive—Speed changers. U. S. Electrical Motors, Inc., Los Angeles, Calif.
Varipitch—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.
Vari-Pitch—Speed changers, pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Variport—Valves. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Vari-Vent—Air and vacuum valves. Dole Valve Co., Chicago, Ill.
Vee Jet—Spray nozzles. Spraying Systems Co., Chicago, Ill.
Veelos—V-belts. Manheim Mfg. & Belting Co., Manheim, Pa.
Velometer—Air velocity meters, anemometers. Illinois Testing Laboratories, Inc., Chicago, Ill.
Venko—Boilers. Waterfilm Boilers, Inc., Jersey City, N. J.
Vent-Vac—Heating systems. Anderson Products, Inc., Cambridge, Mass.
Ventalarm—Gages. Scully Signal Co., Cambridge, Mass.
Vento—Traps. Haines & Co., William S., Philadelphia, Pa.
Vent-Rite—Air valves. Anderson Products, Inc., Cambridge, Mass.
Ventube—E. I. du Pont de Nemours & Co., Inc., Fabrics & Finishes Dept., Wilmington, Del.
Ventura—Fans. American Blower Corp., Detroit, Mich.
Venturafin—Unit heaters. American Blower Corp., Detroit, Mich.
Venturi—Fan housings. Commercial Shearing & Stamping Co., Youngstown, O.
Venturi—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Venturi-Flo—Air diffusers. Barber-Colman Co., Rockford, Ill.
Verco—Insulating cement. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Vercoustic—Insulation. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Vermiculite—Insulation. International Vermiculite Co., Girard, Ill.
Vernier-Set—Time switches. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Versalend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
Versa-Tool—Electric drills. York Electric & Machine Co., York, Pa.
Vertical—Unit heaters. American Blower Corp., Detroit, Mich.
Vertiflow—Unit heaters. Young Radiator Co., Racine, Wis.
Vescote—Coatings. Vesco Corp., New York, N. Y.
V-Flat—Pulleys and sheaves. Dayton Rubber Co., Dayton, O.
Vibracork—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Vibrashock—Absorbers, bases and pads. Robinson Aviation, Inc., Vibrashock Div., Teterboro, N. J.
Vibrasorber—Vibration absorbers. Chicago Metal Hose Corp., Maywood, Ill.
Vibro-Bar—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Vibro-Dampers—Bases. Korfund Co., Long Island City, N. Y.

Vibro Insulators—Bases. Goodrich Co., B. F., Akron, O.
Vibro-Isolator—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Victory—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Victron—Electric motors, louvers and shutters, propeller fan blades and fans. Victor Electric Products, Inc., Cincinnati, O.
Vim—Gaskets, leather packing. Houghton & Co., E. F., Philadelphia, Pa.
Vim Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.
Visaflame—Controls. Mercoid Co., The, Chicago, Ill.
Visoleak—Detectors. Western Thermal Equipment Co., Los Angeles, Calif.
Vistand—Vise stands. Armstrong Mfg. Co., Bridgeport, Conn.
Vitalaire—Air conditioning units. Ice Cooling Appliance Corp., Morrison, Ill.
Vitalloy—Wrenches. Billings & Spencer Co., Hartford, Conn.
Vitra-Carlite—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Vitricel—Refractories. Carey Mfg. Co., Philip, The, Cincinnati, O.
Vitriram—Furnace cement. U. S. Stoneware Co., New York, N. Y.
Vix-Syn—Rubber and synthetic packing. Houghton & Co., E. F., Philadelphia, Pa.
V-Meth-L—Refrigerant. Virginia Smelting Co., West Norfolk, Va.
Voladjuster—Dampers. Barber-Colman Co., Rockford, Ill.
Volcano—Ventilators. Iwan Brothers, South Bend, Ind.
Volocitrol—Louvers, regulators. Barber-Colman Co., Rockford, Ill.
Vornadofan—Fans. Sutton Corp., O. A., Beacon Bldg., Wichita, Kan.
Vortex—Pumps. Lawrence Pump & Engine Co., Lawrence, Mass.
Vortex—Nozzles. Phillips Cooling Tower Co., Inc., New York, N. Y.
V-tite—Gaskets. Goetze Branch, Johns-Manville, New York, N. Y.
V-to-V—Pulleys and sheaves. Dayton Rubber Co., Dayton, O.
Vulcalock—Fittings, pipe, tanks, valves. Goodrich Co., B. F., Akron, O.
Vulcan—Stands, tongs, vises. Williams & Co., J. H., Buffalo, N. Y.
Vulcan Superior—Tongs, vises. Williams & Co., J. H., Buffalo, N. Y.
Vulcatex—Compounds. Horn Co., A. C., Long Island City, N. Y.
Vulco—Belts, drives, pulleys. Gates Rubber Co., Denver Colo.
Vyncote—Coatings. Watson-Standard Co., Pittsburgh, Pa.
Vynal—Coatings. Watson-Standard Co., Pittsburgh, Pa.

W. & McD.—Strainers. Watson & McDaniel Co., Philadelphia, Pa.
W-S—Fittings. Watson-Stillman Co., Roselle, N. J.
W & T—Anemometers, feeders, gages indicators, hygrometers, meters, relays. Wallace & Tiernan Co., Inc., Newark, N. J.
W & W—Pipe hangers. Western Wire Products Co., St. Louis, Mo.
Walco-Parmelee — Wrenches. Walworth Co., New York, N. Y.
Walltube—Radiator brackets. Arjac Products Inc., Rochester, N. Y.
Walseal Silbraz—Fittings, valves. Walworth Co., New York, N. Y.
Warco — Combustion chambers, refractories. Walsh Refractories Corp., St. Louis, Mo.
Warco—Valves. Bridgeport Brass Co., Bridgeport, Conn.
Wat-a-mat—Water meters. Pfening Co., Fred D. Columbus, O.
Watco—Cooling towers, humidifiers, spray nozzles, spraying systems. Water Cooling Corp., New York, N. Y.
Water-Boy—Feeders. Maid-'O-Mist, Inc., Chicago, Ill.
Water-King—Pumps. Peerless Pump Div., Food Machinery Corp., Los Angeles, Calif.
Water-Maker—Water heaters. Catskill Metal Works, Inc., Catskill, N. Y.
Waterloo Airfoil—Diffusers, grilles, registers. Titus Mfg. Corp., Waterloo, Ia.
Way Loctor—Doors and panels. Walsh-Spencer Co., Boston, Mass.
Weaco—Preheaters, thermostats. Warren Electric Appliance Co., Warren, Pa.
Wear-Proof—Pumps. Schneible Co., Claude B., Detroit, Mich.
Wearweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Weathermaker—Unit air conditioners. Carrier Corp., Syracuse, N. Y.
Weather-Man—Regulators, switches, thermostats. Automatic Devices Co., Chicago, Ill.
Weathermaster—Unit air conditioners. Carrier Corp., Syracuse, N. Y.
Weathermatic—Hot water heating systems. Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Weatherstat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Weatherwood—Insulation. United States Gypsum Co., Chicago, Ill.
Webco—Brakes. Webb Machine & Tool Co., Imperial, Pa.
Webster-Nesbitt—Unit heaters. Webster & Co., Camden, N. J.
Webster-Nesbitt "Little Giant"—Unit heaters. Nesbitt, Inc., John J. Philadelphia, Pa.
Weco—Gas burners. Webster Engineering Co., Tulsa, Okla.
Wedgbelt—V belts and v-belt drives, pulleys. American Pulley Co., Philadelphia, Pa.
Weir—Furnaces, stokers. Meyer Furnace Co., The, Peoria, Ill.
Weir & Meyer—Heaters. Meyer Furnace Co., The, Peoria, Ill.
Weiralead—Lead alloy coated sheets. Weirton Steel Co., Weirton, W. Va.
Weirzin—Electrolytic zinc coated sheets. Weirton Steel Co., Weirton, W. Va.
Weldells—Welding fittings. Taylor Forge & Pipe Works, Chicago, Ill.
Weldolets—Fittings. Bonney Forge & Tool Works, Allentown, Pa.
Weldotrol—Spot welders. Westinghouse Electric Corp., East Pittsburgh, Pa.
Weld-O-Tron—Arc welders. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Westco—Fans. Northwest Foundry and Furnace Co., Portland, Ore.
WesCo—Solenoids. West Coast Electric Mfg. Co., Los Angeles, Calif.
Wesco Giant—Furnaces. Northwest Foundry & Furnace Co., Portland, Ore.
Western—Fans, furnaces, heaters. International Sales Co., San Francisco, Calif.
Westernaire—Fans. Western Engineering & Mfg. Co., Los Angeles, Calif.
Westo—Water treatment. Western Chemical Co., Kansas City, Mo.
Westherm VisOdry — Dehydrators. Western Thermal Equipment Co., Los Angeles, Calif.
Whirlcone — Spray nozzles. Water Cooling Equipment Corp., St. Louis, Mo.
Whirljet—Spray nozzles. Spraying Systems Co., Chicago, Ill.
White Star—Valves. Powell Co., Wm., Cincinnati, O.
Whitson—Steam traps. Healy Ruff Co., St. Paul, Minn.
Whiz—Drills. Paramount Products Co., New York, N. Y.
Wilco—Bi-metals. Wilson Co., H. A., The, Newark, N. J.
Wilco—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Williams-Hager—Valves. Williams Gauge Co., The, Pittsburgh, Pa.
Wilson—Arc welders. Air Reduction Sales Co., New York, N. Y.
Wind-O-Cool—Fans. Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Wind-O-Vent—Window ventilator and filter units. Reed Unit-Fans, Inc., New Orleans, La.
Wingfoil—Fans, ventilators. Wing Mfg. Co., L. J., New York, N. Y.
Winkler—Burners, stokers. U. S. Machine Corp., Lebanon, Ind.
Winter-Chaser—Air conditioning units, furnaces, heaters. Campbell Heating Co., Des Moines, Ia.
Wissco—Grilles. Wickwire Spencer Steel Div. of Colorado Fuel & Iron Corp., Buffalo, N. Y.
Witch—Bolts, hangers, protectors. Carpenter & Paterson, Inc., East Boston, Mass.
Wonder—Tubing benders. American Pipe Bending Machine Co., Poultney, Vt.
Workhorse—Motors. Crozier Machine Tool Co., Hawthorne, Calif.

X-L — Gaskets, packing. Excelsior Leather Washer Co., Rockford, Ill.
Xacto—Meters. Bowser, Inc., Fort Wayne, Ind.
"X" Boilerliquid—Compounds. X Laboratories, Inc., New York, N. Y.
"X" Flush-Rustoff—Boiler cleaning compounds. X Laboratories, Inc., New York, N. Y.
"X" Pipejoin—Cement and compounds. X Laboratories, Inc., New York, N. Y.
Xit—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

Yager's—Solder. Benson Co., Inc., Alex R., Hudson, N. Y.
Yarway—Alarms, clamps, expansion joints, nozzles, strainers, traps, valves. Yarnall-Waring Co., Philadelphia, Pa.
Yellow-Jacket—Heating boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Yemco—Oil burners, water heaters. York Electric & Machine Co., York, Pa.
Yoloy—Pipe, sheet, tubing. Youngstown Sheet & Tube Co., Youngstown, O.
Yorkaire—Unit air coolers. York Corp., York, Pa.
York-Heat—Heating equipment. York-Shipley, Inc., Industrial Div., York, Pa.
York-Power—Oil burners. York-Shipley, Inc., Industrial Div., York, Pa.

Zecret—Insulation. Robinson Insulation Co., Great Falls, Mont.
Zeph Air—Heaters. XXth Century Heating and Ventilating Co., Akron, O.
Zero—Cement, refractories. Standard Fuel Engineering Co., Detroit, Mich.
Zig Zag—Heat exchangers. Stout & Sons, David, St. Louis, Mo.
Zincgrip—Sheets. American Rolling Mill Co., Middletown, O.
Zincilate—Coatings. Industrial Metal Protectives, Inc., Dayton, O.
Zone-Master—Heating systems. W-H Engineering Co., Chicago, Ill.
Zono—Combustion chambers. Robinson Insulation Co., Great Falls, Mont.
Zonolite—Insulation, refractories and refractory cement. Robinson Insulation Co., Great Falls, Mont.
Zonolite—Insulation. Universal Zonolite Insulation Co., Chicago, Ill.

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 3—MANUFACTURERS' ADDRESSES

A

A. & A. Register Co., 8327 Clinton Rd., Cleveland 9, O.
A & J Co., 844-848 W. 59th St., Chicago 21, Ill.
A-J Mfg. Co., 2119 Washington St., Kansas City, Mo.
Acadia Synthetic Products Div., Western Felt Works, 4115 Ogden Ave., Chicago, Ill.
Accurate Sheet Metal Mfg. Works, 2336-38 Milwaukee Ave., Chicago 47, Ill.
Accurate Metal Weatherstrip Co., Inc., 216 E. 26th St., New York 10, N. Y.
Ace Engineering Co., 1435 W. 15th St., Chicago 8, Ill.
Acer & Whedon, Inc., Medina, N. Y.
Acheson Mfg. Co., Braddock P. O., Rankin, Pa.
Acker Organization, Inc., W. M., 3167 Fulton Rd., Cleveland, O.
Ackermann Mfg. Co., Wheeling, W. Va.
Acme Asbestos Covering & Flooring Co., 236 N. Elizabeth St., Chicago 7, Ill.
Acme Electric Welder Co., 2618 Fruitland Rd., Los Angeles 11, Calif.
● Acme Industries, Inc., Cor. Mechanic and Ganson Sts., Jackson, Mich.
Acme Mfg. Co., State Rd. below Rhawn St., Holmesburg, Philadelphia 36, Pa.
Acme Refining Co., The, W. 56th & W. & L. E. Ry., Cleveland, O.
Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.
Acme White Lead & Color Works, 8250 St. Aubin Ave., Detroit 11, Mich.
Acorn Refining Co., 8001 Franklin Ave., Cleveland, O.
Acro Electric Co., 1305 Superior Ave., Cleveland 14, O.
Adam Electric Co., Frank, 3650 Windsor St., St. Louis, Mo.
Adams Co., The, E. 4th St., P. O. Box 268, Dubuque, Ia.
Adams Co., Inc., R. P., 225-7 E. Park Dr., Buffalo 17, N. Y.
Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago 32, Ill.
Advance Electric & Relay Co., 1260 W. Second St., Los Angeles 26, Calif.
Advance Fan & Blower Co., 3428 Bagley, Detroit, Mich.
Aeolus Dickinson, 3320 S. Artesian Ave., Chicago 8, Ill.
Aerofin Corp., 410 S. Geddes St., Syracuse 1, N. Y.
Aeroil Products Co., Park Ave. at 57th St., West New York, N. J.
Aeroquip Corp., 300 S. East Ave., Jackson, Mich.
Aerotec Corp., The, Greenwich, Conn.
Aerovent Fan Co., 710 E. Ash St., Piqua, O.
Agaloy Tubing Co., Springfield, O.
Aget-Detroit Co., 613 First National Bank Bldg., Ann Arbor, Mich.
Agnew Electric Co., Milford, Mich.
Agnew & Tomlinson, 10-26 Jackson Ave., Long Island City 1, N. Y.
● Ahlberg Bearing Co., 3081 W. 47th St., Chicago 32, Ill.
● Air Conditioning Products Co., 2340 W. Lafayette Blvd., Detroit 16, Mich.
Air Control Products, Inc., Coopersville, Mich.
Air Controls, Inc., Div. of Cleveland Heater Co., 2310 Superior Ave., Cleveland 14, O.
● Air Devices, Inc., 17 E. 42nd St., New York 17, N. Y.
Air Equipment Co., 1713 W. Carroll Ave., Chicago 12, Ill.
Air Equipment Co., 2730 Zuni St., Denver, Colo.
Air Equipment Sales Co., 416 W. Eighth St., Los Angeles 14, Calif.
● Air Filter Corp., 2514 W. Lisbon Ave., Milwaukee 5, Wis.
Air Reduction Sales Co., 60 E. 42nd St., New York 17, N. Y.
● Air & Refrigeration Corp., 475 Fifth Ave., New York 17, N. Y.
Aire-Foile Fan & Blower Co., 4737 W. Vernor Highway, Detroit, Mich.
Airgard Mfg. Co., 362 W. Erie St., Chicago 10, Ill.
Airmaster Corp., 4317 Ravenswood Ave., Chicago 13, Ill.
Air-Maze Corp., 5200 Harvard Ave., Cleveland 5, O.
AirO-Fin Register Co., 21700 Wyoming, Detroit 20, Mich.
Air-Stream Filter Corp., 2100 Washington Ave., St. Louis 3, Mo.
Airtemp, Div. of Chrysler Corp., 1119 Leo St., Dayton 1, O.
● Airtherm Mfg. Co., 711 S. Spring Ave., St. Louis 10, Mo.
Airwasher Corp., 1122 N. Washington Ave., Lansing, Mich.
Ajax Flexible Coupling Co., Westfield, N. Y.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., 216-220 E. Front St., Cincinnati 2, O.
Akron Metallic Gasket Co., 155 N. Union, P. O. Box 911, Akron 9, O.
Akwa Heaters, Inc., 1955 Park Ave., New York 35, N. Y.
Alabama Pipe Co., Anniston, Ala.
Aladdin Heating Corp., 2222 San Pablo Ave., Oakland 12, Calif.
Albertson & Co., Inc., Sioux City 3, Ia.
Albright Equipment Co., 100 Station St., Johnstown, Pa.
● Alco Valve Co., 865 Kingsland Ave., St. Louis 5, Mo.
Aldrich Co., The, Wyoming, Ill.
Aldrich Pump Co., 4 Pine St., Allentown, Pa.
Alert Engineering Products, 315 W. Woodbridge St., Detroit 26, Mich.
Alexander Bros., 406 N. 3rd, Philadelphia, Pa.
Alfol Insulation Co., Inc., 155 E. 44th St., New York 17, N. Y.
All Metal Weatherstrip Co., 2241 N. Knox Ave., Chicago 39, Ill.
All-State Welding Alloys Co., Inc., 96 W. Post Rd., White Plains, N. Y.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.
● Allen-Bradley Co., 1335 S. First St., Milwaukee, Wis.
Allen Stoker Co., 235 S. Penn St., Allentown, Pa.
● Alliance Mfg. Co., Alliance, O.
Allied Control Co., Inc., 2 East End Ave., New York, N. Y.
Allied Control Valve Div., Skinner Chuck Co., Norwalk, Conn.
Allied Weld-Craft, Inc., 401 W. South St., Indianapolis 4, Ind.
Allington & Curtis Mfg. Co., 1800 Holland Ave., Saginaw, Mich.
● Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
● Allis Co., Louis, The, 427 E. Stewart St., Milwaukee 7, Wis.
Alloy Steel Products Co., 1506 W. Elizabeth Ave., Linden, N. J.
Allpax Co., Inc., Mamaroneck, N. Y.
Alpha Metals, Inc., 363 Hudson Ave., Brooklyn 1, N. Y.
Alphil Spot Welding Co., 1058 Pacific St., Brooklyn, N. Y.
Alrose Chemical Co., Box 1294, Providence, R. I.
Alsoco Corp., 10 E. 52nd St., New York, N. Y.
Alten's Foundry & Machine Works, 226 W. Wheeling St., Lancaster, O.
Alton Mfg. Co., 1111 Camp St., Dallas 2, Tex.
Alton Mineral Wool Insulation Co., 1415 S. Compton, St. Louis 4, Mo.
● Aluminum Co. of America, 801 Gulf Bldg., Pittsburgh 19, Pa.
Amercoat Div., American Pipe & Construction Co., P. O. Box 3428, Terminal Annex, Los Angeles 54, Calif.
Amerform Corp., Real Estate Trust Bldg., Philadelphia 7, Pa.
American Agile Corp., 5806 Hough Ave., Cleveland 3, O.
American Air Conditioning Co., Boulevard Bldg., Detroit, Mich.
● American Air Filter Co., Inc., 373 Central Ave., Louisville 8, Ky.
American Automatic Typewriter Co., 614 N. Carpenter St., Chicago, Ill.
American Blower Corp., Detroit 32, Mich.
● American Brass Co., 414 Meadow St., Waterbury 88, Conn.
American Car & Foundry Co., 30 Church St., New York 8, N. Y.
American Cast Iron Pipe Co., 2930 N. 16th St., Birmingham 2, Ala.
American Coal Burner Co., 12-20 E. Erie St., Chicago 11, Ill.
American Coils Co., 25-27 Lexington St., Newark 5, N. J.
American Coolair Corp., 3604 Mayflower St., P. O. Box 2300, Jacksonville 3, Fla.
American Cooling Tower Co., 2710 McGee St., Kansas City 8, Mo.
American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y.
American Die & Tool Co., Inc., 2nd & Buttonwood Sts., Reading, Pa.
● American District Steam Co., 25 Bryant St., North Tonawanda, N. Y.
American District Telegraph Co., 155 Sixth Ave., New York, N. Y.
American Engineering Co., Aramingo Ave. and Cumberland St., Philadelphia 25, Pa.
American Flange & Mfg. Co., Inc., 30 Rockefeller Plaza, New York 20, N. Y.
American Flexible Coupling Co., 1801 Pittsburgh Ave., Erie, Pa.
American Foundry & Furnace Co., Washington St. at McClun, Bloomington, Ill.
American Furnace Co., 2719-31 Delmar Blvd., St. Louis 3, Mo.
American Gas Accumulator Co., 1027 Newark Ave., Elizabeth 3, N. J.
American Hair & Felt Co., 1828 Merchandise Mart, Chicago 54, Ill.
American Hard Rubber Co., 11 Mercer St., New York 13, N. Y.
American Heat Corp., 1044 Little Bldg., Boston, Mass.
American Injector Co., 1481-14th St., Detroit 16, Mich.
American Instrument Co., Silver Springs, Md.
American K. A. T. Corp., 331 Madison Ave., New York 17, N. Y.
American-Larson Ventilating Co., 1004 Keystone Bank Bldg., Pittsburgh 22, Pa.
American Locomotive Co., Alco Products Div., 30 Church St., New York 8, N. Y.
American Locomotive Co., Diesel Engine Div., Auburn, N. Y.
American Machine Products Co., 401 S. Third Ave., Marshalltown, Ia.
American Manganese Bronze Co., Rhawn & Hegerman Sts., Philadelphia, Pa.
American-Marietta Co., 43 E. Ohio St., Chicago 11, Ill.
American-Marsh Pumps, Inc., 60 Capital Ave., N. E., Battle Creek, Mich.
American Metal Hose Branch, American Brass Co., The, 698 S. Main St., Waterbury 88, Conn.
American Metal Products Co., 730 Hudgins St., Box 66, Sylvania Sta., Fort Worth 9, Tex.
American Metal Weather Strip Co., 144 N. Division Ave., Grand Rapids 2, Mich.
American Meter Co., Inc., 60 E. 42nd St., New York 17, N. Y.
American Moistening Co., 260 W. Exchange St., Providence, R. I.
American Molded Products Co., 1644 N. Honore St., Chicago 22, Ill.
American Nickeloid Co., 113 Second St., Peru, Ill.
American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14, Ill.
● American Pipe Bending Machine Co., Inc., 17 Furnace St., Poultney, Vt.
American Pipe Tool Co., 4856 W. Kinzie St., Chicago 44, Ill.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29, Pa.

● Advertisement in this issue. See Index to Advertisers, page 416.

● American Radiator & Standard Sanitary Corp., P. O. Box 1226, Pittsburgh 30, Pa.
● American Rolling Mill Co., The, 461 Curtis St., Middletown, O.
American Screw Co., 21 Stevens St., Providence, R. I.
American Sheet Metal Works, 331 N. Alexander, New Orleans, La.
American Solder & Flux Co., 2152 E. Norris St., Philadelphia 25, Pa.
American Steel Band Co., Heidelberg, Pa.
American Steel & Wire Co., United States Steel Corp. Subsidiary, Rockefeller Bldg., Cleveland 13, O.
American Sterilizer Co., Erie, Pa.
American Thermal Industries, 440 Illinois, Detroit 1, Mich.
American Thermometer Co., 2907 Clark Ave., St. Louis, Mo.
American Ventilating Hose Co., 15 Park Row, New York 7, N. Y.
American Warming & Ventilating Co., 1017-1021 Summit St., Toledo 4, O.
American Water Softener Co., Lehigh Ave. and 4th St., Philadelphia 33, Pa.
American Welding & Mfg. Co., Griswold St., N. E., Warren, O.
American Well Wks., 100 N. Broadway, Aurora, Ill.
American Wheelabrator & Equipment Corp., 619 S. Byrkit St., Mishawaka, Ind.
American Zinc Products Co., Greencastle, Ind.
Ames Hydrovac, Inc., 290 Scholes St., Brooklyn 6, N. Y.
Ames Iron Works, Division of Pierce Butler Radiator Corp., Oswego, N. Y.
Ammco Tools, Inc., North Chicago, Ill.
Ampex Electric Corp., 1155 Howard Ave., P. O. Box "AP," San Carlos, Calif.
Ampion Corp., 488 47th St., Long Island City 1, N. Y.
Anchor Packing Co., 401 N. Broad St., Philadelphia 8, Pa.
Andale Co., 1740 Cherry St., Philadelphia 3, Pa.
Andersen Corp., Bayport, Minn.
● Anderson Co., V. D., The, 1949 W. 96th St., Cleveland 2, O.
Anderson Diesel Engine Co., 6245 State Rd., Philadelphia 35, Pa.
Anderson Products, Inc., 17 Tudor St., Cambridge 39, Mass.
Anderson-Stolz Corp., 1731 Walnut St., Kansas City 8, Mo.
● Anemostat Corp. of America, 10 E. 39th St., New York 16, N. Y.
Anetsberger Bros., 3505 Elston Ave., Chicago, Ill.
Annis Air Filters, 602 S. Central Ave., Glendale 4, Calif.
Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Anti-Friction Bearings Co., 2020 S. Figueroa St., Los Angeles 7, Calif.
Apex All Weather Products, Engineering Div., 228 N. La Salle St., Chicago 1, Ill.
● Apex Engineering Co., 75 E. Wacker Dr., Chicago 6, Ill.
Apollo Steel Co., 609 Warren Ave., Apollo, Pa.
Applied Mechanics Co., 167 Oliver St., Boston 10, Mass.
April Showers Co., 4126 Eighth St., N. W., Washington 11, D. C.
Aqua-Mist Co., 426 Jefferson St., Topeka, Kans.
Aqua-Sorb Co., 21 S. 16th St., East Orange, N. J.
Aquatic Chemical Laboratories, Inc., 95 Liberty St., New York 6, N. Y.
Arabol Mfg. Co., 110 E. 42nd St., New York 17, N. Y.
Arco Co., 7301 Bessemer Ave, Cleveland 4, O.
Arcos Corp., 1515 Locust St., Philadelphia 2, Pa.
Arcweld Mfg. Co., Inc., 3469 Third Ave., W., Seattle 99, Wash.
Arens Controls, Inc., 2267 S. Halsted St., Chicago, Ill.
Arex Co., 333 N. Michigan Ave., Chicago 1, Ill.
Arjac Products Inc., 55-59 Halstead St., Rochester 10, N. Y.
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Armour Ammonia Works, 1355 W. 31st St., Chicago, Ill.
Armstrong-Blum Mfg. Co., 5700 Bloomingdale Rd., Chicago, Ill.
Armstrong Bros. Tool Co., 5200-5300 W. Armstrong Ave., Chicago 30, Ill.
Armstrong Co., The, Post Ave. and South St., Detroit 17, Mich.
Armstrong Control Co., Inc., P. O. Box 4637, Portland 2, Ore.
Armstrong Cork Co., 4400 Concord St., Lancaster, Pa.
● Armstrong Machine Wks., 874 Maple St., Three Rivers, Mich.
Armstrong Mfg. Co., 303 Knowlton St., Bridgeport 8, Conn.
Arrow-Hart & Hegeman Elect. Co., 103 Hawthorne St., Hartford 6, Conn.
Arrowhead Rubber Co., 2244 E. 37th St., Los Angeles 11, Calif.
Art Valve Co., 4662 N. Lincoln Ave., Chicago 25, Ill.
Ashton Valve Co., 161-1st St., Cambridge 42, Mass.
Askania Regulator Co., 1603 S. Michigan Ave., Chicago 16, Ill.
Atkins & Co., E. C., 402 S. Illinois St., Indianapolis 9, Ind.
Atlantic Metal Hose Co., Inc., 123 W. 64th St., New York, N. Y.
Atlantic Pipebending & Fabricating Corp., 552 River Rd., Edgewater, N. J.
Atlantic Steel Boiler Co., 24th St. and Brown St., Philadelphia, 46, Pa.
Atlantic Steel Co., P. O. Box 1714, Atlanta 1, Ga.
Atlas Chemical Co., Marietta, O.
Atlas Utilities Co., Inc., 17 Exchange St., Providence 3, R. I.
Atlas Valve Co., Inc., 282 South St., Newark, N. J.
Atlas Welding Accessories Co., 14820 Wyoming Ave., Detroit 21, Mich.
Auburn Burner Co., Lock Box 269, Auburn, Ind.
Auburn Foundry Inc., Stoker Div., Auburn, Ind.
Auditorium Conditioning Corp., 17 E. 42nd St., New York, N. Y.
● Auer Register Co., 3608 Payne Ave., Cleveland 14, O.
Aurora Pump Co., 619 Loucks St., Aurora, Ill.
Austin-Mason Co., 15 Park Row, New York, N. Y.
● Autempco Corp., 521 Fifth Ave., New York 17, N. Y.
Autoforce Ventilating System, 244 Washington St., Boston 8, Mass.
Automatic Control Co., 1011 University Ave., St. Paul 4, Minn.
● Automatic Devices Co., 53 W. Jackson Blvd., Chicago 4, Ill.
Automatic Electric Mfg. Co., 10 State St., Mankato, Minn.
Automatic Firing Corp., 6504 Olive Blvd., St. Louis 5, Mo.
Automatic Gas Equipment Co., 301 Brushton Ave., Pittsburgh 21, Pa.
● Automatic Products Co., 2460 N. 32nd St., Milwaukee 10, Wis.
Automatic Switch Co., 391 Lakeside Ave., Orange, N. J.
Automatic Temperature Control Co., Inc., 5212 Pulaski Ave., Philadelphia 44, Pa.
Azor Corp., 107 Montgomery Ave., Irvington, N. J.

B

B & B Tool & Specialty Co., The, 1704 Shafor Blvd., Dayton 9, O.
B & M Mfg. Co., 19 N. Harrison St., East Orange, N. J.
B/W Controller Corp., 2200 E. Maple Ave., Birmingham, Mich.
Babbitt Chemical Specialties Co., 630 Fifth Ave., New York 20, N. Y.
● Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh 8, Pa.
Bache, Semon & Co., Greenwich & Morton Sts., New York 14, N. Y.
Badger Fire Extinguisher Co., 624 Somerville Ave., Somerville 43, Mass
● Badger & Sons Co., E. B., Cambridge Div., 260 Bent St., Cambridge 41, Mass.
Badham Insulation Co., Inc., Birmingham, Ala.
Baer Bros., 438 W. 37th St., New York 18, N. Y.
Bahnson Co., 1001 S. Marshall St., Winston-Salem, N. C.
Bailey Co., Chas. M., 667 Folsum St., San Francisco 7, Calif.
Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, O.
Baker & Co., Inc., 113 Astor St., Newark 5, N. J.
Baker Ice Machine Co., Inc., South Windham, Me.
● Baldor Electric Co., 4353 Duncan Ave., St Louis 10, Mo.
Baldwin Belting, Inc., 85 Chambers St., New York 7, N. Y.
Baldwin De La Vergne Sales Corp., Paschall P. O., Philadelphia, Pa.
Baldwin-Hill Co., 531 Klagg Ave., Trenton 2, N. J.
Baldwin Locomotive Works, Eddystone Div., Eddystone, Pa.
Ball Welding Works, Inc., 10154 Edes Ave., Oakland 3, Calif.
Ballantyne Co., 1707-11 Davenport St., Omaha 2, Neb.
Balloffet Dies and Nozzle Co., 6825 Adams St., Guttenberg, N. J.
● Baltimore Aircoil Co., Inc., 402 Colvin St., Baltimore 2, Md.
Bantam Bearing Div., The Torrington Co., South Bend 2, Ind.
Bar-Brook Mfg. Co., Inc., 6133 Linwood Ave., Shreveport, La.
● Barber-Colman Co., 1228 Rock St., Rockford, Ill.
Barber Gas Burner Co., 3704 Superior Ave., Cleveland 14, O.
Barclay, Inc., Robert, 128 N. Peoria St., Chicago, Ill.
Barco Mfg. Co., Not Inc., 1801 Winnemac Ave., Chicago 40, Ill.
Bargar Sheet Metal Co., 12401 Euclid St., Cleveland, O.
Barnes & Jones, Inc., 128 Brookside Ave., Jamaica Plain, Boston 30, Mass.
Barnes Manufacturing Co., Mansfield, O.
Barnes Tool Co., The, 152 Brewery St., New Haven 6, Conn.
Barrett Div., The, Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Barrett, Haentjens & Co., Hazleton, Pa.
Barrett Machine Co., 912-916 Behan St., N. S., Pittsburgh 12, Pa.
Bart Mfg. Co., 227 Main St., Belleville 9, N. J.
Bartlett Hayward, Div. of Koppers Co., 200 Scott St., Baltimore, Md.
Bartlett Mfg. Co., 3003 E. Grand Blvd., Detroit 2, Mich.
Barton Co., 118 S. Eighth St., Minneapolis, Minn.
Barton Instrument Co., 3500 Union Pacific Ave., Los Angeles 23, Calif.
Basic Refractories, Inc., 845 Hamma Bldg., Cleveland 15, O.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bath Co., Cyril, The, E. 70th and Machinery Ave., Cleveland 8, O.
● Bauer & Black, Div. of the Kendall Co., 2500 S. Dearborn St., Chicago 16, Ill.
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.
Bayer Co., 4030 Chouteau Ave., St. Louis 10, Mo.
Bayley Blower Co., 1817 S. 66th St., Milwaukee 14, Wis.
Beach-Russ Co., 64A Church St., New York, N. Y.
Beacon-Morris Corp., 60 Brainerd Rd., Allston, Boston 34, Mass.
● Bear Mfg. Co., Industrial Div., Rock Island, Ill.
Bearings Co. of America, 501 Harrisburg Ave., Lancaster, Pa.
Bearlee Products Co., 1255 S. Monroe, Green Bay, Wis.
Beaton & Cadwell Mfg. Co., 185 Main St., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Beatty Machine & Mfg. Co., 934 150th St., Hammond, Ind.
Beaver Pipe Tools, Inc., 310 Dana Ave., Warren, O.
Beck Engineering Combustion Kompany, 2100 Cole St., St. Louis 6, Mo.
Beckett & Co., Inc., Thomas, 2118 Griffin St., Dallas 2, Tex.
Beckley Perforating Co., 301 North Ave., Garwood, N. J.
Belfield Co., H., 435 N. Broad St., Philadelphia 23, Pa.
Belknap Mfg. Co., 800 Union Ave., Bridgeport 1, Conn.
● Bell & Gossett Co., Morton Grove, Ill.
Belmont Packing & Rubber Co., The, Butler & Sepviva Sts., Philadelphia 37, Pa.
Belmont Smelting & Refining Wks., Inc., 349 Belmont Ave., Brooklyn 7, N. Y.
Belter Electric Mfg. Co., G. J., The, 3830-32 Olive St., St. Louis 8, Mo.
Bendix Aviation Corp., Eclipse-Pioneer Div., Metal Hose Dept., Teterboro, N. J.
Benjamin Air Rifle Co., 1527 S. 8th St., St. Louis 4, Mo.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Bennett Oil Co., 964 S. Saddle Creek Rd., Omaha 6, Neb.
Benson Co., Inc., Alex R., 1040 Bay Rd., So., Hudson, N. Y.
Berger Bros. Co., 229-237 Arch St., Philadelphia 6, Pa.
Berger Mfg. Div., Republic Steel Corp., 1038 Belden Ave., Canton 5, O.
Bern's Specialty Mfg. Co., 2278 Elston Ave., Chicago, Ill.
Bernz Co., Otto, 280 Lyell Ave., Rochester 6, N. Y.
Bertsch & Co., Inc., Church St., Cambridge City, Ind.
Best Register Co., 2005 W. Oklahoma Ave., Milwaukee 7, Wis.
Bethlehem Foundry & Machine Co., W. Second St., Bethlehem, Pa.
● Bethlehem Steel Co., Bethlehem, Pa.
Betz Corp., 460 State St., Hammond, Ind.
Beverly Shear Mfg. Co., 3004 111th St., Chicago 43, Ill.
Bien Air Conditioning Co., 362 W. Garvey Ave., Monterey Park, Calif.

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Biersach & Niedermeyer Co., 1937 N. Hubbard St., Milwaukee 12, Wis.
Bigelow Co., 174 River St., New Haven 13, Conn.
Biggs Boiler Wks. Co., The, Case Ave. and B. & O. R. R., E. Akron 5, O.
Bignall & Keeler Machine Wks., Edwardsville, Ill.
Billings & Spencer Co., 1 Laurel St., Hartford 1, Conn.
Binks Mfg. Co., 3114-40 Carroll Ave., Chicago 12, Ill.
Birchfield Boiler, Inc., 2503 E. 11th St., Tacoma 1, Wash.
Bird-Archer Co., 4337 North American St., Philadelphia 40, Pa.
● Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., Cleveland 14, O.
● Black & Decker Mfg. Co., 628 Pennsylvania Ave., Towson 4, Md.
Black Magic Products Co., P. O. Box 1703, Tulsa, Okla.
Black Mfg. Co., The, 1426 W. Baltimore St., Baltimore 23, Md.
Black-Sivalls & Bryson, Inc., 7501 E. 10th St., Kansas City 3, Mo.
Blackburn-Smith Mfg. Co., River St., Hoboken, N. J.
Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee 1, Wis.
Blackmer Pump Co., 1920A Century Ave., S. W., Grand Rapids 9, Mich.
Blaisdell Compressor Co., 227 Fulton St., New York, N. Y.
Blazer, M., & Son, 173 Market St., Passaic, N. J.
Bliss Co., E. W., 450 Amsterdam Ave., Detroit 2, Mich.
Blocksom & Co., E. 5th St., Michigan City, Ind.
Blood Brothers Machine Co., Div. of Standard Steel Spring Co., Allegan, Mich.
Blower Application Co., 3165 N. 30th St., Milwaukee 10, Wis.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., 177 Westfield Ave., W. Roselle Park, N. J.
Bodine Electric Co., 2254 W. Ohio St., Chicago 12, Ill.
Bogue Electric Co., 37 Kentucky Ave., Paterson 3, N. J.
Bohn Aluminum & Brass Corp., 2306 Franklin St., Detroit, Mich.
Boiler Room Equipment Inc., 468 Fourth Ave., New York 16, N. Y.
Bonafide Genasco, Inc, 295 Fifth Ave., New York 16, N. Y.
● Bonney Forge & Tool Wks., 350 Green St., Allentown, Pa.
Bordo Co., Inc., L. J., 115 New St., Glenside, Pa.
Borg-Erickson Corp., 469 E. Ohio St., Chicago 11, Ill.
Borm Mfg. Co., Elgin, Ill.
Boston Auto Gage Co., 70 West St., Pittsfield, Mass.
Boston Gear Works, Inc., North Quincy, Mass.
Boston Woven Hose & Rubber Co., P. O. Box 1071, Boston 3, Mass.
Botfield Refractories Co., Swanson & Clymer Sts., Philadelphia 47, Pa.
Bowen Engineering, Inc., Garwood, N. J.
Bowser, Inc., 1302 E. Creighton Ave., Fort Wayne 2, Ind.
Boylston Steam Specialty Co., 116-122 W. Illinois St., Chicago, Ill.
Brabender Corp., Rochelle Park, N. J.
Brauer Supply Co., A. G., 2100 Washington Ave., St. Louis 3, Mo.
Breidert Co., G. C., 3129 San Fernando Rd., Los Angeles 41, Calif.
Bremil Mfg. Co., 1204 Pittsburgh Ave., Erie, Pa.
Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.
Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., Connecticut Ave., Bridgeport 1, Conn.
Bristol Co., The, P. O. Box 1790, Waterbury 91, Conn.
Brockway Co., 361 Church St., Naugatuck, Conn.
Bronson Fan Mfg. Co., 1237 Riverside Dr., Los Angeles 31, Calif.
Brooke Engineering Co., Inc., 4517 Wayne Ave., Philadelphia 44, Pa.
Brookfield Engineering Laboratories, Sharon, Mass.
Brooklyn Varnish Mfg. Co., 50 Jay St., Brooklyn 1, N. Y.
Brooks Equipment Corp., 217 Hudson St., Hoboken, N. J.
Bros Boiler & Mfg. Co., Wm., 1057 Tenth Ave., S. E., Minneapolis 14, Minn.
Brown-Brockmeyer Co., Inc., P. O. Box 976, Dayton 1, O.
Brown Co., 500 Fifth Ave., New York, N. Y.
Brown Electric Co., 98-11 65th Ave., Forest Hills, N. Y.
Brown Fintube Co., The, Elyria, O.
Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., 4534 Wayne Ave., Philadelphia 44, Pa.
● Brownell Co., 300 N. Findlay St., Dayton 1, O.
Browning Mfg. Co., Inc., 1940 Browning Blvd., Maysville, Ky.
Brundage Co., The, 500-514 N. Park St., Kalamazoo 11, Mich.
Bruning Co., Inc., Charles, 4754 Montrose Ave., Chicago 41, Ill.
Brunner Mfg. Co., 1821 E. Broad St., Utica 1, N. Y.
Bryan Steam Corp., P. O. Box 337, Peru, Ind.
● Bryant Heater Co., 17825 St. Clair Ave., Cleveland 10, O.
Bubar, Hudson H., Old Lyme, Conn.
Buckeye Tools Corp., 29 W. Apple St., Dayton 1, O.
Buda Co., Harvey, Ill.
Buffalo Bolt Co., North Tonawanda, N. Y.
● Buffalo Forge Co., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Meter Co., 2917 Main St., Buffalo 14, N. Y.
● Buffalo Pumps, Inc., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Tank Corp., Dunellen, N. J.; Buffalo, N. Y.
Buffalo Turbine Corp., 2165 Bailey Ave., Buffalo 11, N. Y.
Buflovac Equipment Div. of Blaw-Knox Co., 50 Winchester Ave., Buffalo 11, N. Y.
● Builders-Providence, Inc., Div. of Builders Iron Foundry, 9 Codding St., Providence 1, R. I.
Bullard Co., The, 286 Canfield Ave., Bridgeport 2, Conn.
Bump Pump Co., La Crosse, Wis.
Bundy Steam Trap Co., Nashua, N. H.
Bundy Tubing Co., 8101 E. Jefferson Ave., Detroit 14, Mich.
Burden Co., 1000 N. Orange Dr., Los Angeles 38, Calif.
Burke Electric Co., 1201 W. 12th St., Erie, Pa.
Burke Stoker & Mfg. Co., 921 W. 19th St., Chicago, Ill.
Burling Instrument Co., Air Conditioning Div., 253 Springfield Ave., Newark 3, N. J.
Burnham Corp., Boiler Div., Main St., Irvington, N. Y.
Burnham Stoker Co., 505 Columbia St., Vancouver, Wash.
Burnley Battery & Mfg. Co., Clay St., North East, Pa.
Burrows Mfg. Co., F. A., 318 E. Poplar St., York, Pa.
Burt Mfg. Co., 41 E. South St., Akron 11, O.
Bury Compressor Co., 18th & Cascade Sts., Erie, Pa.
● Bush Mfg. Co., 179 South St., West Hartford, Conn.
Byers Co., A. M., Clark Bldg., Pittsburgh 22, Pa.
Byron Jackson Co., P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif.

C

C-B Tool Co., Wabank Rd., Lancaster, Pa.
C & H Air Conditioning Fan Co., Inc., 1603 DeKalb Ave., N. E., Atlanta 6, Ga.
Cabot, Inc., Samuel, 141 Milk St., Boston 9, Mass.
Calbar Paint & Varnish Co., 2612-26 N. Martha St., Philadelphia 25, Pa.
Caldwell Co., W. E., 2120 Brook St., Louisville, Ky.
Calgon, Inc., Hagan Bldg., Pittsburgh 30, Pa.
California Brass Mfg. Co., 1447 Naud St., Los Angeles 12, Calif.
Callahan Can Machine Co., Inc., 80 Richard St., Brooklyn, N. Y.
Calorider Corp., 1 Atlantic St., Stamford, Conn.
Camloc Fastener Corp., 420 Lexington Ave., New York, N. Y.
Campbell Co., J. A., 645 E. Wardlaw Rd., Long Beach 7, Calif.
Campbell Engineering Co., 918 N. Union St., Appleton, Wis.
● Campbell Heating Co., 31st & Dean, P. O. Box 833, Des Moines 4, Ia.
Campbell Heating Co., E. K., 1606 Main St., Kansas City 8, Mo.
Cam-Stat, Inc., Div. of The Paul Henry Co., 2310 S. LaCienega Blvd., Los Angeles 34, Calif.
Canatsey Electric Mfg. Co., Box 556, Kansas City 8, Mo.
Cannelton Sewer Pipe Co., RadianTile Div., 120 LaSalle St., Chicago 3, Ill.
Cannon Chemical Co., Inc., 210 Broadway, Everett 49, Mass.
Canton Stoker Corp., 407 Andrew Place, S. W., Canton 1, O.
Canvas Products Co., 1236 S. 7th St., St. Louis 4, Mo.
Capitol Brass Works, Div. of Bohn Aluminum & Brass Corp., 2306 Franklin St., Detroit, Mich.
Carbide and Carbon Chemicals Corp., 30 E. 42nd St., New York 17, N. Y.
Carey Mfg. Co., Philip, Wayne Ave., Lockland, Cincinnati 15, O.
Cargocaire Engineering Corp., 15 Park Row, New York 7, N. Y.
Carlin Co., Anthony, 2717 E. 75th St., Cleveland, O.
Carling Turbine Blower Co., 25 St. John's Rd., Worcester 3, Mass.
● Carnegie-Illinois Steel Corp., United States Steel Corp. Subsidiary, Carnegie Bldg., Pittsburgh 30, Pa.
Carnes, Inc., John R., Greenlawn Ave. & Erie R. R., Lima, O.
Carney Co., Inc., The, Mankato, Minn.
Carolina Aniline & Extract Co., Inc., 301 S. Cedar St., Charlotte 1, N. C.
Carpenter Heating & Stoker Co., 1929 E. 55th St., Cleveland 3, O.
Carpenter & Paterson, Inc., 1190 Bennington St., East Boston 28, Mass.
● Carrier Corp., 302 S. Geddes St., Syracuse 1, N. Y.
Carter Paint Co., 310 N. Main St., Liberty, Ind.
● Carty & Moore Engineering Co., 511 W. Larned St., Detroit 26, Mich.
Carver Pump Co., Muscatine, Ia.
Case & Son Mfg. Co., W. A., 33 Main St., Buffalo 3, N. Y.
● Cash Co., A. W., P. O. Box 551, Decatur, Ill.
Cash Valve Mfg. Co., A. W., 6621 E. Wabash Ave., Decatur 80, Ill.
Cashin Co., W. D., 69 A. St., Boston 27, Mass.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Caterpillar Tractor Co., 600 W. Washington St., Peoria, Ill.
Catskill Metal Works, Inc., Catskill, N. Y.
Celco Corp., Dept. 101, 110 E. 42nd St., New York 17, N. Y.
Celotex Corp., The, 120 S. La Salle Bldg., Chicago 3, Ill.
Cement Lined Pipe Co., 93 Brookline St., Lynn, Mass.
Central Brass Mfg. Co., 2950 E. 55th St., Cleveland 4, O.
Central Die Casting & Mfg. Co., Inc., 2935 W. 47th St., Chicago, Ill.
Central Foundry Co., 386 Fourth Ave., New York 16, N. Y.
Central Rubber & Steel Corp., P. O. Box 420, Findlay, O.
Central States Mfg. Co., Inc., 1200-12 Summit St., Arkansas City, Kan.
Central Station Steam Co., 2920 E. Woodbridge St., Detroit 7, Mich.
Central Wire & Iron Works, 621 E. Locust St., Des Moines, Ia.
Centrifix Corp., 3029 Prospect Ave., Cleveland 15, O.
Centri-Spray Corp., 14290 Meyers Rd., Detroit 27, Mich.
Century Aircraft Co., 5601 W. Century Blvd., Inglewood, Calif.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Century Engineering Co., 5529 S. Vermont Ave., Los Angeles 37, Calif.
Century Engineering Corp., 401-431 3rd St., S. E., Cedar Rapids, Ia.
Century Fan & Ventilator Co., 45 Cedar St., Stamford, Conn.
Certain-teed Products Corp., 120 S. LaSalle St., Chicago 3, Ill.
Certified Flexible Couplings, 369 Lexington Ave., New York 17, N. Y.
Certified Furnace Co., Div. Stainless & Steel Products Co., 1000 Berry Ave., St. Paul 4, Minn.
Chace Co., W. M., 1606 Beard Ave., Detroit 9, Mich.
Chain Belt Co., 1617 W. Bruce, Milwaukee 4, Wis.
Chamberlin Co. of America, 1254 La Brosse St., Detroit 26, Mich.
Champion Blower & Forge Co., Harrisburg Ave. and Charlotte St., Lancaster, Pa.
Champion Furnace Pipe Co., 215 Eaton St., Peoria 3, Ill.
Champion Machine & Forging Co., 3695 E. 78th St., Cleveland 5, O.
Champion Unit Heater Co., 3535 Fillmore St., Chicago 24, Ill.
Chandler Co., 804 First Ave., N. W., Cedar Rapids, Ia.
Chaplin-Fulton Mfg. Co., 28-40 Penn Ave., Pittsburgh, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Char-Gale Mfg. Co., 4325 Hiawatha Ave., Minneapolis 6, Minn.
Chase Brass & Copper Co., 236 Grand St., Waterbury 91, Conn.
Chase-Shawmut Co., Newburyport, Mass.
Cheeseman-Elliot Co., Inc., Kent Ave., Brooklyn 11, N. Y.

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Chelsea Fan & Blower Co., Inc., 1206 S. Grove St., Irvington 11, N. J.
Chelsea Metal Stamping Co., 95 8th Ave., New York 11, N. Y.
Cheney Metal Products Co., 623 Prospect St., Trenton 5, N. J.
Chicago Belting Co., 113-125 N. Green St., Chicago 7, Ill.
Chicago Bridge & Iron Co., 332 S. Michigan Ave., Chicago 4, Ill.
Chicago Die Casting Mfg. Co., 2510-14 W. Monroe St., Chicago 12, Ill.
Chicago Expansion Bolt Co., 1338 W. Concord Pl., Chicago 22, Ill.
Chicago Fan & Fin Coil Co., 1937 Walnut St., Chicago 12, Ill.
Chicago Filter Co., Joliet, Ill.
Chicago Fire Brick Co., 1467 N. Elston Ave., Chicago 22, Ill.
Chicago Float Works, Inc., Dept. T., 2330 S. Western Ave., Chicago 8, Ill.
Chicago Furnace Supply Co., 1278 Clybourn Ave., Chicago, Ill.
Chicago Metal Hose Corp., 1315 S. Third Ave., Maywood, Ill.
Chicago Metal Mfg. Co., 3724 S. Rockwell St., Chicago 32, Ill.
Chicago Nipple Mfg. Co., 1616 S. Laramie Ave., Cicero 50, Ill.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
Chicago Pump Co., 2323 Wolfram St., Chicago 18, Ill.
Chicago Seal Co., 20 N. Wacker Dr., Chicago 6, Ill.
Chicago Specialty Mfg. Co., 2954 Lawrence Ave., Chicago 25, Ill.
Chicago Steel Tank Co., 6400 W. 66th, Chicago 38, Ill.
Chicago-Wilcox Mfg. Co., E. 77th St. and Anthony Ave., Chicago, Ill.
Chiksan Co., Brea, Calif.
Chisholm Co., Allen E., 2640 E. Burnside St., Portland, Ore.
Cincinnati Electrical Tool Co., The, 2684 Madison Rd., Cincinnati 8, O.
Cincinnati Shaper Co., Hopple, Garrard and Elam, Cincinnati 25, O.
Cinder Products Corp., 75 Ellenfield St., Providence, R. I.
Circulators & Devices Mfg. Corp., 22 Rose St., New York, N. Y.
Cissell Mfg. Co., Inc., W. M., 831 S. First St., P. O. Box 1143, Louisville 1, Ky.
● Clarage Fan Co., Porter St., Kalamazoo 16, Mich.
Clark Bros. Bolt Co., Milldale, Conn.
Clark Controller Co., 1146 E. 152nd St., Cleveland 10, O.
Clark Cooper Co., Palmyra, N. J.
Clark Dust Control Co., 210 N. Mozart St., Chicago, Ill.
Clark Jr. Electric Co., Jas., 615 Bergman St., Louisville 3, Ky.
Clark Mfg. Co., 1830 E. 38th St., Cleveland 14, O.
Claronex Products, Inc., 239 Java St., Brooklyn, N. Y.
Clauss Shear Co., Fremont, O.
Clay Equipment Corp., Cedar Falls, Ia.
● Clayton & Lambert Mfg. Co., 1701 Dixie Hwy., Louisville 10, Ky.
Clayton Mfg. Co., P. O. Box 550, El Monte, Calif.
● Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis.
Cleghorn Co., 86 Broad St., Boston, Mass.
Cleveland Brass Mfg. Co., The, 4606 Hamilton Ave., Cleveland, O.
Cleveland Graphite Bronze Co., 17000 St. Clair Ave., Cleveland 10, O.
Cleveland Humidifier Co., 7802 Wade Park Ave., Cleveland 3, O.
Cleveland Punch & Shear Works Co., E. 40th and St. Clair Ave., Cleveland 14, O.
Clifford Mfg. Co., 564 E. First St., Boston, Mass.
Climax Engineering Co., Clinton, Ia.
Climax Machinery Co., Indianapolis, Ind.
Clinton Metallic Paint Co., P. O. Box 278, Clinton, N. Y.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Clow & Sons, James B., 201-299 N. Talman Ave., Chicago 12, Ill.
Cochrane Corp., 3131 N. 17th St., Philadelphia 32, Pa.
Coe Mfg. Co., Bank St., Painesville, O.
Cohoes Rolling Mill Co., Canvass and Cortland Sts., Cohoes, N. Y.
Cole-Sewell Engineering Co., 2288 University Ave., St. Paul 4, Minn.
Colebrook & Sons, Inc., W. H., 246 Walton St., Syracuse, N. Y.
Colonial Alloys Co., Metals Div., Ridge Ave. and Crawford St., Philadelphia 19, Pa.
Columbia Radiator Co., 3400 Walnut St., McKeesport, Pa.
● Columbia Steel Co. (Sub. United States Steel Corp.), Russ Bldg., 235 Montgomery St., San Francisco 6, Calif.
Columbian Steel Tank Co., 1509 W. 12th St., Kansas City 7, Mo.
Columbus Heating & Ventilating Co., 182 N. Yale Ave., Columbus 16, O.
Columbus Steam Pump Wks. Co., 724 W. Gay St., Columbus 8, O.
Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.
Combustion Engineering Co., Inc., 200 Madison Ave., New York 16, N. Y.
Comfort Products Corp., 2220 S. Lamesa, Dallas 2, Tex.
Commercial Filters Corp., 18 W. Third, Boston 27, Mass.
Commercial Plastics Co., 201 N. Wells St., Chicago 6, Ill.
Commercial Shearing & Stamping Co., 1775 Logan, P. O. Box 719, Youngstown 1, O.
Commonwealth Brass Corp., 5781-5835 Commonwealth Ave., Detroit 8, Mich.
Commonwealth Electric Welder Mfg. Co., 3200-F W. Oxford St., Philadelphia, Pa.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Condenser Service & Engineering Co., Inc., 95 River St., Hoboken, N. J.
Conditionaire Unit Co., 2821 Montrose Ave., Chicago 18, Ill.
Congress Drives Div., Tann Corp., 3750 E. Outer Drive, Detroit 12, Mich.
Congress Fan & Electric Co., P. O. Box 3747, Peninsula Sta., Daytona Beach, Fla.
Conklin Brass & Copper Co., Inc., T. E., 54-60 Lafayette St., New York 13, N. Y.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Connery Construction Co., 2nd and Luzerne Sts., Philadelphia 40, Pa.
● Connor Engineering Corp., W. B., 114 E. 32nd St., New York 16, N. Y.
Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Continental Air Filters, Inc., 2550 Helm St., Louisville 1, Ky.
Continental Diamond Fibre Co., Newark, Del.
Continental Electric Co., Inc., 323 Ferry St., Newark, N. J.
Continental Machine Co., 1952-54 Maud Ave., Chicago, Ill.
Continental Motors Corp., Muskegon 82, Mich.
Continental Products Co., 1150 E. 22nd St., Euclid 17, O.
Continental Rubber Wks., 2000 Liberty St., Erie, Pa.
Continental Screw Co., Mt. Pleasant St., New Bedford, Mass.
Continental Steel Corp., 1108 S. Main St., Kokomo, Ind.
Controlair Mfg. Co., 1932 S. Compton Ave., Los Angeles, Calif.
Controldtemp Equipment Sales Corp., 236 Butler St., Brooklyn 17, N. Y.
Cook, Inc., A. D., Lawrenceburg. Ind.
Cook Electric Co., Diaphlex Div., 2700 Southport Ave., Chicago 14, Ill.
Coolstream Corp., The, 240 Butler St., Brooklyn, N. Y.
Cooper Alloy Foundry Co., Hillside, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Cooper Co., Clark, Palmyra, N. J.
Copeland Refrigeration Corp., Sidney, O.
Coppus Engineering Corp., 344 Park Ave., Worcester 2, Mass.
Corbman Bros., Inc., 315 N. 7th St., Philadelphia 6, Pa.
Cordo Chemical Co., 34 Smith St., Norwalk, Conn.
Cork Import Corp., 39 Park Pl., Englewood, N. J.
Cork Insulation Co., Inc., 155 E. 44th St., New York, N. Y.
Corley Co., Inc., The, One Exchange Place, Jersey City 2, N. J.
Corning Glass Works, Corning, N. Y.
Coroaire Heater Corp., The, 1124 Hanna Bldg., Cleveland 15, O.
Coughlan Co., G. N., West Orange, N. J.
Cramer Co., Inc., R. W., The, Centerbrook, Conn.
● Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Crane Packing Co., 1872 Cuyler Ave., Chicago 13, Ill.
Crawford Co., 3220 W. 31st St., Chicago 23, Ill.
Crescent Tool Co., 230 Harrison St., Jamestown, N. Y.
Crise Mfg. Co., The, 2040 E. Main, Columbus, O.
Crittall Radiant Heating, Inc., Richard, 665 Fifth Ave., New York 22, N. Y.
Crocker-Wheeler Electric Mfg. Co., Div. Joshua Hendy Iron Works, Ampere 14, N. J.
Croll-Reynolds Engineering Co., Inc., 17 Johns St., New York 7, N. Y.
Croll & Son, Jesse G., 2326-2606 Germantown Ave., Philadelphia, Pa.
Cronholm Mfg. Co., 3500 S.E. Hawthorne Ave., Portland 15, Ore.
Crotty Mfg. Co., 133-15 35th Ave., Flushing, L. I., N. Y.
Crown Controls Co., Inc., New Bremen, O.
Crown Die & Tool Co., 108 N. Jefferson St., Chicago 6, Ill.
Crown Iron Works Co., 1202 N. E. Tyler, Minneapolis, Minn.
Crozier Machine Tool Co., 684 N. Prairie Ave., Hawthorne, Calif.
Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y.
Cryer Trap & Valve Co., Inc., 366 Madison Ave., New York 17, N. Y.
Cuno Engineering Corp., 80 S. Vine St., Meriden, Conn.
Curtis Automotive Devices, Inc., 8 Norwood Ave., Dayton 7, O.
Curtis & Curtis Co., The, 450 Garden St., Bridgeport, Conn.
● Curtis Refrigerating Machine Div., Curtis Mfg. Co., 1950 Kienlen Ave., St. Louis 20, Mo.
Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis.
Cyclotherm Corp., 90 Broad St., New York 4, N. Y.
Cyrus Shank Co., 625 W. Jackson Blvd., Chicago 6, Ill

D

Dahlquist Mfg. Co., Inc., Div. of Process Engineering Inc., 628 Somerville Ave., Somerville 43, Mass.
Dahlstrom Machine Works, 5014 N. Kedzie Ave., Chicago 25, Ill.
Dahlstrom Metallic Door Co., S. E. cor. E. Second and Buffalo Sts., Jamestown, N. Y.
Daigger & Co., A., 161 W. Kinzie St., Chicago, Ill.
Dalmo-Victor Co., San Carlos, Calif.
Dalzen Tool & Mfg. Co., 12255 E. Eight Mile Rd., Detroit 5, Mich.
Dampney Co. of America, 1243 River St., Hyde Park, Boston 36, Mass.
Dana Fan & Blower Corp., 3501-27 Colerain Ave., Cincinnati 23, Ohio
Danzer Metal Works Co., Box 201, Hagerstown, Md.
Darcoid Co., Inc., 145 Sixth Ave., New York 13, N. Y.
Darling Valve & Mfg. Co., 701 First St., Williamsport, Pa.
Dart Mfg. Co., E. M., 134 Thurbers Ave., Providence 5, R. I.
Davey Compressor Co., Kent, O.
Davidson Co., M. T., 43-53 Keap St., Brooklyn 11, N. Y.
Davidson Hy Duty Roof Fan Co., 213 California St., Newton, Mass.
Davies & Co., Wayne, Westboro, Mass.
Davis & Co., Inc., Dean W., 1006 First St., Kentland, Ind.
Davis Co., Inc., Herbert H., 1616 S. Laramie, Chicago, Ill.
Davis Emergency Equipment Co., 83 Halleck St., Newark 4, N. J.
Davis Engineering Corp., 1070 E. Grand St., Elizabeth 4, N. J.
Davis Regulator Co., 2546 S. Washtenaw Ave., Chicago 8, Ill.
Davison Chemical Corp., The, 20 Hopkins Pl., Baltimore 3, Md.
Day & Night Mfg. Co., Refrigeration Div., 710 Duarte Ave., Monrovia, Calif.
Day Co., The, 810-830 Third Ave., N. E., Minneapolis 13, Minn.
Dayton-Acme Co., 930 York St., Cincinnati, O.
Dayton Air Compressor Co., Dayton, O.
Dayton Rubber Co., 2342 W. Riverview Ave., Dayton 1, O.
● Dean Brothers Pumps, Inc., 323 W. 10th St., Indianapolis 7, Ind.
Dean Hill Pump Co., 4000 E. 16th St., Indianapolis 7, Ind.
Dearborn Chemical Co., 310 S. Michigan Ave., Chicago 4, Ill.
Debevoise Co., The, 968 Grand St., Brooklyn 6, N. Y.
DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., P. O. Box 72, Decatur, Ala.
Decatur Pump Co., 41 Elk St., Decatur 70, Ill.

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Defender Instrument & Regulator Co., 815 Clark Ave., St. Louis 2, Mo.
De Laval Steam Turbine Co., Trenton 2, N. J.
Delavan Engineering Co., 414-12th St., Des Moines 9, Ia.
Delco Appliance Div., General Motors Corp., P. O. Box 230, Rochester 1, N. Y.
● Delco Products Div., General Motors Corp., 329 E. First St., Dayton 1, O.
Delta Shipbuilding Div., American Shipbuilding Co., Terminal Tower, Cleveland, O.
Delta-Star Electric Co., 2400 Block, W. Fulton St., Chicago, Ill.
Deming Co., 14 Aetna St., Salem, O.
Demuth & Sons, Charles, 245 Elm Place, Mineola, L. I., N. Y.
Dersch, Gesswein & Neuert, Inc., 4849 W. Grand Ave., Chicago 39, Ill.
Desmond-Stephan Mfg. Co., Urbana, O.
Desolvo Co., The, 719 Foreland St., Pittsburgh 12, Pa.
Despatch Oven Co., 619 S. E. Eighth St., Minneapolis 14, Minn.
d'Este Div., American Chain & Cable Co., Inc., Reading, Pa.
Detroit Brass & Malleable Works, 100 S. Campbell, Detroit 9, Mich.
Detroit Diesel Engine Co., General Motors Corp., 13400 W. Outer Dr., Detroit 23, Mich.
● Detroit Lubricator Co., 5900 Trumbull Ave., Detroit 8, Mich.
Detroit Seamless Steel Tubes Co., c/o Grand River Station, Box A, Detroit 8, Mich.
Detroit Stamping Co., 337 Midland Ave., Detroit 3, Mich.
Detroit Steel Products Co., 2250 E. Grand Blvd., Detroit, Mich.
Detroit Stoker Co., Fifth Floor, General Motors Bldg., Detroit 2, Mich.
DeVilbiss Co., The, 300 Phillips Ave., Toledo 1, O.
Devine Mfg. Co., J. P., Div. of H. K. Porter Co., Inc., 1932 Oliver Bldg., Pittsburgh 22, Pa.
Devoe & Raynolds Co., Inc., 44th St. and 1st Ave., New York 17, N. Y.
Dewey Shepard Boiler Co., Peru, Ind.
Dial Light Co. of America, Inc., 900 Broadway, New York 3, N. Y.
Diamond Chain & Mfg. Co., 438 Kentucky Ave., Indianapolis 7, Ind.
Diamond Chemical Products, 17 E. 48th St., New York, N. Y.
Diamond Expansion Bolt Co., Inc., 500 North Ave., Garwood, N. J.
Diamond Iron Works, Inc., P. O. Box 719, Minneapolis, Minn.
Diamond Mfg. Co., 253 W. Eighth St., Wyoming, Pa.
Diamond Power Specialty Corp., P. O. Box 288, Detroit 31, Mich.
Diceler Div. of General Machine & Mfg. Co., Blair St. and Spring Garden Ave., Berwick, Pa.
Dick Co., Inc. R. & J., 24-48 Sade St., Passaic, N. J.
Dickinson, Aeolus, 3320 S. Artesian Ave., Chicago, Ill.
Diehl Mfg. Co., Finderne Plant, 1106 Finderne Ave., Somerville, N. J.
Dietzgen Co., Eugene, 2425 Sheffield Ave., Chicago 14, Ill.
Dillon Co., 220-C E. Brady St., Tulsa, Okla.
Dillon Co., Inc., W. C., 5410 W. Harrison St., Chicago 44, Ill.
Dillon Steam Boiler Wks., Inc., D. M., Crocker St., Fitchburg, Mass.
Dixon Crucible Co., Joseph, Wayne & Monmouth Sts., Jersey City, N. J.
Doall Co., The, 254 N Laurel Ave., Des Plaines, Ill.
Dockson Corp., 3839 Wabash Ave., Detroit 8, Mich.
Dockstader, Inc., S. E., 1128 Munsey Bldg., Washington 4, D. C.
Dodge Mfg. Corp., 500 S. Union St., Mishawaka, Ind.
Doheny Co., John J., 326 Lake St., Belmont, Mass.
● Dole Valve Co., The, 1933 Carroll Ave., Chicago 12, Ill.
● Dollinger Corp., 9 Centre Park, Rochester 3, N. Y.
Domestic Engine & Pump Co., Shippensburg, Pa.
Douglas Automatic Controls Co., 4505 Firestone Blvd., South Gate, Calif.
Dow Chemical Co., The, Midland, Mich.
Dow Corning Corp., Midland, Mich.
Dowell Inc., 524 Kennedy Bldg., Tulsa 3, Okla.
Downingtown Iron Works, Wallace Ave., Downingtown, Pa.
Doyle & Roth Mfg. Co., 10-15 49th Ave., Long Island City, N. Y.
● Dravo Corp., Machinery Div., 300 Penn Ave., Pittsburgh 22, Pa.
Drayer & Hanson, Inc., 3301 Medford Ave., Los Angeles 21, Calif.
Dreis & Krump Mfg. Co., 7404 Loomis Blvd., Chicago 36, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., 490 Fisher Ave., Bradford, Pa.
Drico Industrial Corp., 29 Broadway, New York 6, N. Y.
Drinkwater, Inc., Spring & Madison St., Waukegan, Ill.
Dry Air Products Corp., 726 Jackson Place, Washington 6, D. C.
Drying Systems, Inc., 1812½ W. Foster Ave., Chicago 40, Ill.
Dry-Zero Corp., Merchandise Mart, Chicago 54, Ill.
Dual Air Fan Co., 711 W. Lake St., Chicago 6, Ill.
Dudgeon, Inc., Richard, Columbia and Broome Sts., New York 2, N. Y.
● Dunham Co., C. A., 400 W. Madison St., Chicago 11, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Dunn, Inc., Struthers, 1321 Arch St., Philadelphia 7, Pa.
du Pont de Nemours & Co., E. I., Ammonia Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Electrochemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., Inc., E. I., Fabrics & Finishes Dept., Wilmington 98, Del.
Durabla Mfg. Co., 114 Liberty St., New York 6, N. Y.
Durakool, Inc., 1010 N. Main St., Elkhart, Ind.
Duraloy Co., Scottdale, Pa.
● Durant Insulated Pipe Co., 1015 Runnymede St., P. O. Box 88, Palo Alto, Calif.
Duriron Co., Inc., The, 450 N. Findlay St., Dayton 1, O.
Duro Co., 537 Monument Ave., Dayton, O.
Duro Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill.
Dust Filter Co., 4418 N. Clark St., Chicago 40, Ill.
Dust Suppression & Engineering Co., 154 Grove St., Lake Orion, Mich.
Dustlix Corp., 715 N. Van Buren St., Milwaukee, Wis.
Dutton Co., C. H., Portage & Gibson Sts., Kalamazoo 6, Mich.
Dwyer Mfg. Co., F. W., 317 S. Western Ave., Chicago 12, Ill.
Dynamic Air Engineering, Inc., 1619 S. Alameda, Los Angeles 21, Calif.
Dzus Fastener Co., Inc., Babylon, N. Y.

E

● Eagan Co., Walter H., 2336-38 Fairmount Ave., Philadelphia 30, Pa.
Eagle-Picher Co., American Bldg., Cincinnati 1, O.
Eaglesfield Ventilator Co., 910-20 Dorman St., Indianapolis, Ind.
Eastern Air Devices, Inc., Sales and Engineering Offices, 130 Flatbush Ave., Brooklyn, N. Y.
Eastern Engineering Co., 396 Elm St., New Haven 6, Conn.
Eastern Foundry Co., Boyertown, Pa.
Eastern Foundry Co., Peerless Heater Div., Boyertown, Pa.
Eastern Oil & Equipment Co., 27 Portland St., Portland 3, Me.
Eastern Stainless Steel Corp., P. O. Box 1975, Baltimore 3, Md.
Eastman Kodak Co., Kodak Park, Rochester 4, N. Y.
Eckhart Mfg. Co., 470 First Ave., West, Roselle, N. J.
Eclipse Air Brush Co., Inc., 381 Park Ave., Newark, N. J.
Eclipse Fuel Engineering Co., 707 S. Main St., Rockford, Ill.
Econocol Stoker Div. of Cotta Transmission Co., 2340 11th St., Rockford, Ill.
Economy Equipment Co., 919 W. 49th Pl., Chicago 9, Ill.
● Economy Pumps, Inc., 1000 Weller Ave., Hamilton, O.
Economy Valve Seat Co., 2807-13 Fletcher St., Chicago 18, Ill.
Eddy Stoker Corp., 4717 W. North Ave., Chicago 39, Ill.
Eddy Valve Co., Waterford, N. Y.
Edge Moor Iron Wks., Inc., Edge Moor 25, Del.
Edison, Inc., Thomas A., Instrument Div., Lakeside Ave., West Orange, N. J.
Edward Valves, Inc, 1200 W. 145th St., East Chicago, Ind.
Ehret Magnesia Co., Valley Forge, Pa.
Eiker Mfg. Co., Ogallala, Neb.
Eisler Engineering Corp., 754 S. 13th St., Newark 3, N. J.
El Sereno Machine Works, 735 N. Vernon Ave., Azusa, Calif.
Elastic Porcelain Lining Corp., 42 East Ave., Rochester 4, N. Y.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
Elco Tool & Screw Corp., 1800 Broadway, Rockford, Ill.
Electric Arc, Inc., 152 Jelliff Ave., Newark 8, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo 1, O.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland 4, O.
Electric Cord Co., 30 Church St., New York 7, N. Y.
Electric Machinery Mfg. Co., 1331 Tyler St., N. E., Minneapolis 13, Minn.
Electric Service Control, Inc., 205 N. 12th St., Newark 7, N. J.
Electric Sprayit Co., The, 1415-25 Illinois Ave., Sheboygan, Wis.
Electric Steel Foundry Co., 2141 N. W. 25th St., Portland, Ore.
Electrimatic, 2100 Indiana Ave., Chicago 16, Ill.
Electro Dynamic, Div. of the Electric Boat Co., Bayonne, N. J.
Electro Products Laboratories, Inc., 549 W. Randolph St., Chicago, Ill.
Electrol Burner Mfg. Co., Inc., 22 Union Ave., Rutherford, N. J.
Electrol, Inc., 85 Grand St., Kingston, N. Y.
Electromode Corp., 45 Crouch St., Rochester 3, N. Y.
Electro-Switch & Controls Co., 5609 W. Adams Blvd., Los Angeles 16, Calif.
Electrovent Fan & Mfg. Co., 812 W. Lake St., Chicago 7, Ill.
Elgin Softener Corp., Elgin, Ill.
Elgo Shutter & Mfg. Co., 2738 W. Warren Ave., Detroit 8, Mich.
Elliott Co., Jeannette, Pa.
Ellis Drier Co., 2444 N. Crawford Ave., Chicago 39, Ill.
Ellison Draft Gage Co., 214 W. Kinzie St., Chicago 10, Ill.
Ellsworth Pipe & Supply Co., 513 W. Traser St., Milwaukee 3, Wis.
Elraco Engineering Co., 732 W. 58th St., Los Angeles 37, Calif.
Emerson Electric Mfg. Co., The, 8100 Florissant Ave., St. Louis 21, Mo.
Empire Sheet & Tin Plate Co., N. Bowman St., Mansfield, O.
Empire Ventilation Equipment Co., 35-39 Vernon Blvd., Long Island City 1, N. Y.
Endura Mfg. Corp., 45 N. 4th St., Quakerstown, Pa.
Engelhard, Inc., Charles, 900 Passaic Ave., East Newark, N. J.
Engineer Co., 75 West St., New York 6, N. Y.
● Enterprise Engine & Foundry Co., 2949 18th St., San Francisco 10, Calif.
Equipoise Controls, 100 Stevens Ave., Mount Vernon, N. Y.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Ergolyte Mfg. Co., 3627 Lawrence St., N., Philadelphia 40, Pa.
Erickson Specialty Co., 39 Mohawk St., Cohoes, N. Y.
Erie Bolt & Nut Co., Erie, Pa.
Erie City Iron Wks., 1450 East Ave., Erie, Pa.
Erie Tool Wks., 11th & French Sts., Erie 2, Pa.
Ess Instrument Co., 96 Washington Ave., Bergenfield, N. J.
Ess Specialty Corp., 96 S. Washington Ave., Bergenfield, N. J.
Essex Wire Corp., Div. of., 37 Manchester Ave., Detroit, Mich.
Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif.
Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y.
Everhot Products Co., 2059 W. Carroll, Chicago 12, Ill.
Everite Pump & Mfg. Co., Inc., P. O. Box 1391, Lancaster, Pa.
Everlasting Valve Co., 49 Fisk St., Jersey City 5, N. J.
Ewing Mfg. Co., 2545 N.W. 10th, Oklahoma City 7, Okla.
Excelsior Leather Washer Mfg. Co., 720-730 Chestnut St., Rockford, Ill.
Excelsior Steel Furnace Co., The, 118 S. Clinton St., Chicago 6, Ill.
Excelsior Tool & Machine Co., 31st & Ridge Ave., East St. Louis, Ill.
● Extended Surface, Div. of David E. Kennedy, Inc., 58 Second Ave., Brooklyn 15, N. Y.
Extruded Plastics, Inc., New Canaan Ave., Norwalk, Conn.

F

Fafnir Bearing Co., 37 Booth St., New Britain, Conn.
Fairbanks Co., 393 Lafayette St., New York 3, N. Y.

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Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.
Fairmont Aluminum Co., Fairmont, W. Va.
Falcon Equipment Co., 13th St., New Brighton, Pa.
Falstrom Co., 26 Falstrom Court, Passaic, N. J.
Farley Sleeve & Hanger Co., 3748 E. 71st St., Cleveland, O.
Farquhar Co., A. B., Duke St., York, Pa.
Farr Co., 2615 Southwest Dr., Los Angeles 43, Calif.
Farrar & Trefts, 20 Milburn St., Buffalo 12, N. Y.
Farris Engineering Corp., 400 Commercial Ave., Palisades Park, N. J.
● Fedders-Quigan Corp., 57 Tonawanda St., Buffalo 7, N. Y.
Federal Machine & Welder Co., The, Overland Ave., Warren, O.
Federal-Mogul Corp., 11031 Shoemaker St., Detroit 13, Mich.
Federated Metals Div., American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Fee and Stemwedel, Inc., 2210 Wabansia Ave., Chicago 47, Ill.
Felt Products Mfg. Co., 1504 Carroll Ave., Chicago 7, Ill.
Felters Company, The, 210 South St., Boston 11, Mass.
Fenwal, Inc., 200 Pleasant St., Ashland, Mass.
Ferguson & Lange Foundry Co., 1039 Willows St., Chicago, Ill.
Fern, Ralph, 2517 Boulevard Ave., Scranton 9, Pa.
Ferro-Nil Corp., 381 Fourth Ave., New York 16, N. Y.
Fibre Conduit Co., Orangeburg, N. Y.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Filtrine Mfg. Co., Inc., 53 Lexington Ave., Brooklyn 5, N. Y.
Fingles Co., The, Reistertown Rd. at Elgin Ave., Baltimore 17, Md.
Finn & Co., 2850 8th Ave., New York 30, N. Y.
Finn Engineers, Jerry, 201 N. First National Bank Bldg., St. Paul 1, Minn.
Fintube Coil Corp., 19 W. Main St., Alhambra, Calif.
Fire-King Stoker Co., 3760 E. St. Clair, Indianapolis, Ind.
Fireline Stove & Furnace Lining Co., 1800 Kingsbury St., Chicago 14, Ill.
Firemood Machine Wks., Converse, Ind.
Firestone Industrial Products, 1200 Firestone Pkwy., Akron 17, O.
Fir-Tex Insulating Board Co., St. Helens, Ore.
Fischer & Porter Co., 600 County Line Rd., Hatboro, Pa.
Fish-Schurman Corp., 230 E. 45th St., New York 17, N. Y.
● Fisher Governor Co., 205 S. First Ave., Marshalltown, Ia.
● Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York 17, N. Y.
● Flagg & Co., Inc., Stanley G., 1421 Chestnut St., Philadelphia 2, Pa.
Flemm Lead Co., Inc., Bradley Ave. & School St., Long Island City 1, N. Y.
Flexitallic Gasket Co., 8th & Bailey Sts., Camden, N. J.
Flexlock Corp., 411 E. Market St., Akron, O.
Flexo Supply Co., Inc., 4649 Page Blvd., St. Louis 13, Mo.
Flintkote Co., The, 30 Rockefeller Plaza, New York 20, N. Y.
Flori Pipe Co., The, 601 E. Red Bud Ave., St. Louis 15, Mo.
Floridin Co., Warren, Pa.
Flotrol Systems, Inc., 817 N. Lewis Pl., Tulsa, Okla.
Fluid Heat Div., Anchor Post Products, Inc., 6500 Eastern Ave., Baltimore 24, Md.
Fluor Corp., Ltd., The, 2500 S. Atlantic Blvd., Los Angeles 22, Calif.
Flynn & Emrich Co., 301 Holliday St., Baltimore 2, Md.
Follansbee Steel Corp., 3rd and Liberty Aves., Pittsburgh, Pa.
Ford Roofing Products Co., 170 W. Washington St., Chicago 2, Ill.
Forman Air Conditioning & Engrg. Co., 345 W. 40th St., New York 18, N. Y.
Fossum, M. H., 2086 Marshall Ave., St. Paul, Minn.
Foster Engineering Co., 109 Monroe St., Newark, N. J.
Foster Pump Wks., Inc., 46-A Washington St., Brooklyn 1, N. Y.
Foster Wheeler Corp., 165 Broadway, New York 6, N. Y.
Fowler & Wolfe Radiator Co., Oak and Carson Sts., Norristown, Pa.
Fox Control & Mfg. Co., 3589 E. 93rd St., Cleveland, O.
Foxboro Co., 106 Neponset Ave., Foxboro, Mass.
France Packing Co., 6512 Tacony St., Tacony, Philadelphia 35, Pa.
Franklin Electric Co., Inc., Bluffton, Ind.
Frederick Iron & Steel Co., E. 7th St., Frederick, Md.
Freed Products Co., 1510 Third Ave., Moline, Ill.
Freeman Stoker Div., Illinois Iron & Bolt Co., 914 S. Michigan Ave., Chicago 5, Ill.
Fresh-'nd-Aire Co., Div. of Cory Corp., 221 N. LaSalle St., Chicago 1, Ill.
Fretz-Moon Tube Co., Inc., Butler, Pa.
● Frick Co., Waynesboro, Pa.
Friez Instrument Div., Bendix Aviation Corp., Taylor Ave., Towson, Baltimore 4, Md.
Frigidaire Div., General Motors Corp., Dayton 1, O.
Frost Mfg. Co., S. Henderson St., Galesburg, Ill.
Fuel Savers, Inc., 15th and Herr Sts., Harrisburg, Pa.
Fuelguard Co., 2826 Fondren Dr., Dallas 5, Tex.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Fuller Co., 124 Bridge St., Catasauqua, Pa.
● Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Box 400, Knoxville 4, Tenn.
Furst Electronics, 800 W. North Ave., Chicago 22, Ill.

G

G. D. S. Machinery & Supply Co., Inc., 101 Walker St., New York, N. Y.
G. M. Mfg. Co., 50 W. 3rd St., New York 12, N. Y.
G & O Mfg. Co., 138 Winchester Ave., New Haven 8, Conn.
Gallaher Co., The, Owatonna, Minn.
Galv-Weld Products, P. O. Box 37, Sta. D, Dayton 10, O.
Garden City Fan Co., 332 S. Michigan Ave., Chicago 4, Ill.
Gardiner Metal Co., 2514 W. 48th Pl., Chicago 32, Ill.
Gardner-Denver Co., Quincy, Ill.
Garlock Packing Co., 50 Main St., Palmyra, N. Y.
Gas & Oil Industry Laboratories, Inc., 4 Paine Ave., Irvington, N. J.
Gasflux Co., Mansfield, O.
Gates Engineering Co., P. O. Box 1711, Wilmington, Del.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Gatke Corp., 228 N. LaSalle St., Chicago, Ill.
Gehl Bros. Mfg. Co., West Bend, Wis.
Gehri Co., 1117 Tacoma Ave., Tacoma 3, Wash.
Gelert Co., C. R., 35 N. Raymond Ave., Pasadena 1, Calif.
General Blower Co., 8610 Ferris Ave., Morton Grove, Ill.
General Blower Co., Inc., 6137 Market St., Philadelphia 39, Pa.
General Ceramics Co., Keasbey, N. J.
● General Controls Co., 801 Allen Ave., Glendale 1, Calif.
General Corporation, 3353 University Ave., Minneapolis 14, Minn.
General Die and Stamping Co., 262-272 Mott St., New York 12, N. Y.
● General Electric Co., Air Conditioning Dept., 5 Lawrence St., Bloomfield, N. J.
General Electric Co., Apparatus Dept., 1 River Rd., Schenectady 5, N. Y.
General Electric Co., Chemical Dept., 1 Plastics Ave., Pittsfield, Mass.
General Electric Co., Lamp Dept., Nela Park, Cleveland 12, O.
General Engineering & Mfg. Co., 4417 Oleatha St., St. Louis 16, Mo.
General Filters, Inc., 12890 Westwood, Detroit 23, Mich.
● General Fittings Co., 123 Georgia Ave., Providence 5, R. I.
General Furnaces Corp., 42 W. 2nd St., Oswego, N. Y.
General Gas Light Co., 212 N. Park, Kalamazoo 11F, Mich.
General Insulating Products Co., 8821 15th Ave., Brooklyn, N. Y.
General Machinery Co., 3500 Riverside Ave., Spokane 1, Wash.
General Ozone Corp., 1455 W. Congress St., Chicago 7, Ill.
General Plate Div., Metals & Controls Corp., 34 Forest St., Attleboro, Mass.
General Power Plant Corp., 381-4th Ave., New York 16, N. Y.
General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
General Scientific Equipment Co., 27th & Huntingdon Sts., Philadelphia 32, Pa.
Genspring, Inc., 500 Fifth Ave., New York 18, N. Y.
Gerett Corp., M. A., 724 W. Winnebago St., Milwaukee 5, Wis.
Gerstein & Cooper Co., 1 W. Third St., South Boston 27, Mass.
Geuder, Paeschke & Frey Co., W. St. Paul Ave. and N. 15th St., Milwaukee, Wis.
Giannini & Co., Inc., G. M., 285 W. Colorado, Pasadena 1, Calif.
Giant Mfg. Co., South Ave., Council Bluffs, Ia.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gilmer Company, L. H., Div. of United States Rubber Co., Tacony, Philadelphia 35, Pa.
Gisholt Machine Co., 1253 E. Washington Ave., Madison 3, Wis.
Glaser Lead Co., Inc., 31 Wyckoff Ave., Brooklyn, N. Y.
Gleason-Avery, Inc., 27 Clark St., Auburn, N. Y.
Glo Heat Equipment Co., 1951 Grand Central Terminal Bldg., New York 17, N. Y.
● Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4, Wis.
Goese Mfg. Co., 2548 N. 18th St., Milwaukee 6, Wis.
Goethel Sheet Metal Wks., Alfred, 1910 N. Killian Pl., Milwaukee, Wis.
Goettl Bros. Metal Prod. Co., Central Ave., Phoenix, Ariz.
Goetze Branch, Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Golden-Anderson Valve Specialty Co., Keenan Bldg., Pittsburgh, Pa.
Goldens' Foundry & Machine Co., Columbus, Ga.
Goodrich Co., B. F., 548 S. Main St., Akron 18, O.
Goodyear Tire & Rubber Co., 1144 E. Market St., Akron 16, O.
Goodyer Industries, Inc., 224 S. Michigan Ave., Chicago 4, Ill.
Gorman-Rupp Co., Mansfield, O.
Gorton Heating Corp., Cranford, N. J.
Gotham Instrument Co., Inc., 149 Wooster St., New York 12, N. Y.
Goulds Pumps, Inc., Fall St., Seneca Falls, N. Y.
Governair Corp., 513 N. Blackwelder St., P. O. Box 1654, Oklahoma City, 1, Okla.
Grabler Mfg. Co., 6565 Broadway, Cleveland 5, O.
Graham Mfg. Co., Inc., 415 Lexington Ave., New York 17, N. Y.
Graham Transmissions, Inc., 3754 N. Holton St., Milwaukee 12, Wis.
Grand Rapids Die & Tool Co., 1545 Madison S. E., Grand Rapids, Mich.
Granite City Steel Co., 20th & Madison Ave., Granite City, Ill.
● Grant Wilson, Inc., 141 W. Jackson Blvd., Chicago 4, Ill.
Graton & Knight Co., 356 Franklin St., Worcester 4, Mass.
Graver Tank & Mfg. Co., Inc., 4809 Todd Ave., East Chicago, Ind.
Gray Metal Products, Inc., 30 Carleton St., Rochester, N. Y.
Great Lakes Steel Corp., Ecorse, Detroit, Mich.
Great National Air Conditioning Co., 2125 N. Harwood St., Dallas 1, Tex.
Green Fire Brick Co., A. P., Mexico, Mo.
Green Fuel Economizer Co., 780 Main St., Beacon, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Greenfield Tap & Die Corp., Sanderson St., Greenfield, Mass.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., 2136 12th St., Rockford, Ill.
Greer Hydraulics, Inc., 454 18th St., Brooklyn 15, N. Y.
Greiner Co., Emil, 161 Sixth Ave., New York, N. Y.
Grief, Edward C., 64 West End Ave., Bogota, N. J.
Griffith Equipment Co., Inc., Los Angeles, Calif.
● Grinnell Co., Inc., 260 W. Exchange, Providence 1, R. I.
Griscom-Russell Co., The, 285 Madison Ave., New York 17, N. Y.
Grobet File Corp. of America, 421 Canal St., New York 13, N. Y.
Grossenbacher Furnace Co., 9416 W. Milton Ave., Overland 14, Mo.
Grove Regulator Co., 6529 Hollis St., Oakland, Calif.
Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill.
Guardian Products Corp., 1215 E. 2nd St., Michigan City, Ind.
Guild & Garrison, Inc., 43 Keap St., Brooklyn 11, N. Y.
Gunnite Foundries Corp., 302 Peoples Ave., Rockford, Ill.

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Gustin Bacon Mfg. Co., 1412 W. 12th St., Kansas City 7, Mo.
Guth Co., Edwin F., 2615 Washington Blvd., St. Louis 3, Mo.
Gylstrom Co., O., 108 W. Wells St., Milwaukee, Wis.

H

H. & A. Co., 86-100 Leroy Ave., Buffalo 14, N. Y.
H-B Instrument Co., 2518 N. Broad St., Philadelphia 32, Pa.
Haering & Co., Inc., D. W., 205 W. Wacker Dr., Chicago 6, Ill.
● Hagan Corp., Hagan Bldg., Pittsburgh 30, Pa.
Hague & Co., Alfred, 230 Thirty-fourth St., Brooklyn 32, N. Y.
● Haines & Co., William S., 1010-12-14 Wood St., Philadelphia 7, Pa.
Halowax Products Div., Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Halstead & Mitchell, Bessemer Bldg., Pittsburgh 22, Pa.
Hamburg Boiler Wks., Inc., Grand St., Hamburg, Pa.
Hamer Oil Tool Co., 2919 Gardenia Ave., Long Beach 6, Calii.
Hamilton Rubber Mfg. Corp., Box 361, Trenton 3, N. J.
Hammel-Dahl Co., 243 Richmond St., Providence 3, R. I.
Hammett Electric Mfg. Co., 706-708 E. 18th St., Kansas City 8, Mo.
Hammond Brass Wks., Summer Blvd., Hammond, Ind.
Hampton-Cross Co., The, 1014 W. Main St., Louisville, Ky.
Hampton Electric Mfg. Co., 1238 Voskamp St., Pittsburgh 12, Pa.
Handley Brown Heater Co., 2501 Brooklyn Road, Jackson, Mich.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
● Haney Gas Burner & Engineers, 909 S. Myrtle Ave., Monrovia, Calif.
Hanovia Chemical & Mfg. Co., Chestnut St. & N. J. R. R. Ave., Newark 5, N. J.
Hansen Mfg. Co., Inc., Princeton 6, Ind.
Hanson-Gates Mfg. Co., Inc., 174 Lowell St., Reading, Mass.
Hardinge Oil Burner & Mfg. Co., 1700 Berteau St., Chicago 13, Ill.
Hardy, Inc., Charles, 420 Lexington Ave., New York, N. Y.
Hare Engineering Co., 155 W. Congress St., Detroit 26, Mich.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee, Wis.
Harper Co., H. M., 2620 W. Fletcher, Chicago, Ill.
Harrington & King Perforating Co., 5655 Fillmore St., Chicago 44, Ill.
Harris, A. R., 4546 Hohman Ave., Hammond, Ind.
Harris Calorific Co., The, 5501 Cass Ave., N. W., Cleveland 2, O.
Harris & Co., Arthur, 210 N. Aberdeen St., Chicago 7, Ill.
Harrisburg Machinery Corp., 7th & Curtin St., Harrisburg, Pa.
Harrisburg Steel Corp., 10th & Herr Sts., Harrisburg, Pa.
Harry Cooling Towers, Inc., 554 W. 48th St., New York 19, N. Y.
Hart & Cooley Mfg. Co., Holland, Mich.
Hart Mfg. Co., The, Hamilton St., Hartford 1, Conn.
Hartmann Co., Chas., 985 Dean St., Brooklyn, N. Y.
Hartzell Propeller Fan Co., P. O. Box 909, Roosevelt Ave. Piqua O.
Harvey, Inc., Sid, 108 E. Mineola Ave., Valley Stream, N. Y.
Harvey-Whipple, Inc., Springfield, Mass.
Hasco Valve & Machine Co., 1819 W. St. Paul Ave., Milwaukee 3, Wis.
Haskell Mfg. Co., Wm. H., 20 Commerce St., Pawtucket, R. I.
● Hastings Air Conditioning Co., Box 481, 108 S. Colorado Ave., Hastings, Neb.
Hastings Instrument Co., P. O. Box 1275, Hampton, Va.
Haveg Corp., Newark, Del.
● Hayes Furnace & Mfg. Co., 2929 S. Fairfax Ave., Los Angeles 16, Calif.
● Hays Corp., 782 E. 8th St., Michigan City, Ind.
Hays Mfg. Co., 801 W. 12th St., Erie, Pa.
Healy Ruff Co., 2257 University Ave., St. Paul 4, Minn.
Heartley Machine & Tool Co., 900-8 Summit St., Toledo, O.
Heat Equipment not Inc., 1020 E. 75th St., Chicago 19, Ill.
Heat Timer Corp., 160 Fifth Ave., New York 10, N. Y.
Heat Transfer Products, Inc., P. O. Box 516, Carbondale, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Heating Assurance, Inc., 124 E. Augusta St., Spokane 13, Wash.
Hegeler Zinc Co., P. O. Box 599, Danville, Ill.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport 2, Conn.
Hendley & Whittemore, 6 Blackhawk Blvd., Beloit, Wis.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Henry Furnace Co., The, Medina, O.
● Henry Valve Co., 3260 W. Grand Ave., Chicago 51, Ill.
Henry & Wright Mfg. Co., 760 Windsor St., Hartford, Conn.
Herbert Boiler Co., 2300 Bloomingdale Ave., Chicago, Ill.
Her-Born Engineering & Mfg. Co., 212 Columbus Ave., Sandusky, O.
Herbusch Corp., The, 706 Chestnut St., 210 Title Guaranty Bldg., St. Louis 1, Mo.
Hercules Chemical Co., Inc., 332 Canal St., New York 13, N. Y.
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7, N. Y.
Hercules Float Wks., 200 Franklin St., Springfield, Mass.
Hersey Mfg. Co., South Boston, Mass.
Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.
Hertner Co., Inc., 12690 Elmwood Ave., Cleveland, O.
Hess Warming & Ventilating Co., 1211 S. Western Ave., Chicago, Ill.
Hetzel Roofing Products Co., 67 Maine St., Newark 5, N. J.
Hexdall Co., A. M., Morris, Ill.
Highside Chemicals Co., 195 Verona Ave., Newark 4, N. J.
Hill Diesel Engine Div. of Indiana Motocycle Co., Lansing 3, Mich.
Hill, E. Vernon, 6826 W. Highland Ave., Chicago 31, Ill.
Hilo Varnish Corp., 55 Stewart Ave., Brooklyn 6, N. Y.
Hinde & Dauch Paper Co., P. O. Box 861, Sandusky, O.
Hirschman-Pohle Co., Inc., 12 Lent Ave., LeRoy, N. Y.
Hobart Bros., Co., Troy 1, O.
Hobsite Products Co., 835 River St., Paterson 4, N. J.
Hodge Boiler Wks., 99-111 Sumner St., East Boston 28, Mass.
Hodgman Mfg. Co., 135 Washington St., Taunton, Mass.
Hoffman Combustion Engineering Co., 710 Marquette Bldg., Detroit, Mich.
● Hoffman Specialty Co., 1001 York St., Indianapolis 7, Ind.
Holby Valve Co., 1146 Second Ave., New York 21, N. Y.
Holcomb & Hoke Mfg. Co., Inc., 1545 Van Buren, Indianapolis 7, Ind.
Hollands Mfg. Co., Erie, Pa.
Holsclaw Bros. Inc., Evansville 11, Ind.
Holtum Mfg. Co., Freeport, Ill.
Holtzer-Cabot, Div. First Industrial Corp., 125 Armory St., Boston 9, Mass.
Homestead Valve Mfg. Co., P. O. Box 348, Coraopolis, Pa.
Hood Refining Co., 182 N. Hamilton Ave., Greensburg, Pa.
Hook & Ackerman, Inc., 18 E. 41st St., New York 17, N. Y.
Hoppes Mfg. Co., Inc., 850 N. Belmont Ave., N. Springfield, O.
Horn Co., A. C., 43-36 Tenth St., Long Island City, N. Y.
Horton Mfg. Co., 3016 University Ave., S. E., Minneapolis 14, Minn.
Hossfeld Mfg. Co., 460 W. Third St., Winona, Minn.
Hotpoint Inc., 5600 E. Taylor St., Chcago 44, Ill.
Hotstream Heater Co., 2363 E. 69th St., Cleveland 4, O.
Houghton & Co, E. F., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Howard Iron Wks. & Alberger Heater Co., 287 Chicago St., Buffalo 4, N. Y.
Howe Ice Machine Co., 2825 Montrose Ave., Chicago 18, Ill.
Howell Electric Motors Co., Howell, Mich.
Howes-Woods Co., 201 Bridge St., Cambridge, Mass.
Howry-Berg Steel & Iron Works, 2949 N. Spear Blvd., Denver 11, Colo.
Hubbard Mfg. Co., 1014 Marquette Ave., Minneapolis 2, Minn.
Hubbell Corp., 319 N. Albany Ave., Chicago 12, Ill.
Humboldt Mfg. Co., 2016 N. Whipple St., Chicago, Ill.
Hunt & Son, C. B., Inc., Salem, O.
Hunter Fan & Ventilating Co., Inc., 400 S. Front St., Memphis, Tenn.
Hupp Corp., Globe Stamping Div., 1250 W. 76th St., Cleveland 2, O.
Hussey & Co., C. G., 2850 Second Ave., Pittsburgh 19, Pa.
Huyette Co., Inc., Paul B., 401 N. Broad St., Philadelphia 8, Pa.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Hydro-Aire, Inc., 3000 Winona, Burbank, Calif.
Hynes Electric Heating Co., Point & Erie Sts., Camden, N. J.

I

Ice Cooling Appliance Corp., Morrison, Ill.
Ideal Electric & Mfg. Co., E. First & Oak Sts., Mansfield, O.
Ideal Industries, Inc., 1096 Parke Ave., Sycamore, Ill.
● Ilg Electric Ventilating Co., 2841 N. Crawford Ave., Chicago 41, Ill.
● Illinois Engineering Co., 2035 S. Racine Ave., Chicago 8, Ill.
Illinois Malleable Iron Co., 1801 Diversey Parkway, Chicago 14, Ill.
Illinois Oil Products, Inc., 4th Ave. and 24th St., Rock Island, Ill.
● Illinois Testing Laboratories, Inc., 420 N. La Salle St., Chicago 10, Ill.
Illinois Zinc Co., 2959 W. 47th St., Chicago 32, Ill.
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7, Ill.
Imperial Electric Co., 64 Ira Ave., Akron, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
● Independent Register Co., 3747 E. 93rd St., Cleveland 5, O.
Indiana Fan Company, 427 S. Alabama St., Indianapolis 4, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
Industrial Engineering & Equipment Co., 711 S. Theresa Ave., St. Louis 3, Mo.
Industrial Mfg. & Engineering Co., 3845 N. Ravenswood Ave., Chicago 13, Ill.
Industrial Metal Protectives, Inc., Dayton, O.
Industrial Research, Lansdowne, Pa.
Industrial Screw Co., 711 W. Lake St., Chicago 6, Ill.
Industrial Service Laboratories, 7656 W. Forest Home Ave., Milwaukee, 14, Wis.
● Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Inland Steel Products Co., P. O. Box 393, Milwaukee 1, Wis.
Inner-Tite Div. of Yara Engineering Corp., 18 W. Jersey St., Elizabeth 4, N. J.
Instant Drying Corp., 101 Park Ave., New York, N. Y.
Insto-Gas Corp., 1977 E. Woodbridge St., Detroit 7, Mich.
Instrument Associates, Inc., 134 Broadway, Brooklyn 11, N. Y.
Insulite Div. Minnesota and Ontario Paper Co., 500 Baker Arcade Bldg., Minneapolis 2, Minn.
Insul-Wool Insulation Corp., Wichita 12, Kans.
Inter-Coastal Paint Corp., 13th St. and Southern R. R., East St. Louis, Ill.
Interchemical Corp., Finishes Div., 57 State St., Newark 1, N. J.
International Boiler Works, East Stroudsburg, Pa.
International Engineering, Inc., 1145 Bolander Ave., Dayton 1, O.
International Engineering Wks., Inc., Box 71, Framingham, Mass.
International Heater Co., 101 Park Ave., Utica 2, N. Y.
International Moistening Co., 489 S. Main St., Providence, R. I.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
International Nutyp Tool Co., 68 W, First St., Oswego, N. Y.
International Register Co., 2624 W. Washington Blvd., Chicago 12, Ill.
International Sales Co., 2045 Evans Ave., San Francisco 24, Calif.

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International Steel Co., 1545 Edgar St., Evansville, Ind.
International Vermiculite Co., Girard, Ill.
Interstate Sales Co., 1121 Broadway, New York 10, N. Y.
Iona Ventilator Co., Inc., 2821-29 W. Dauphin St., Philadelphia 32, Pa.
Iowa Paint Mfg. Co., 118-20 Eighth St., Des Moines, Ia.
Iron Fireman Mfg. Co., 3170 W. 106 St., Cleveland 11, O.
Irving Flexible Coupling Co., Inc., 1516 W. Slauson Ave., Los Angeles 44, Calif.
Irvington Varnish and Insulator Co., 6 Argyle Terrace, Irvington 11, N. J.
Iwan Brothers, Inc., 1503 Prairie Ave., South Bend 14, Ind.

J

J O Mfg. Co., 8442 Otis St., South Gate, Calif.
Jabsco Pump Co., 2031 Lincoln St., Burbank, Calif.
Jack & Heintz Precision Industries, Inc., Cleveland 1, O.
Jackson Co., Byron, P. O. Box 2017, Terminal Annex, Los Angeles 54 Calif.
● Jackson & Church Co., 321 N. Hamilton Ave., Saginaw 65, Mich.
Jacobs Co., B. & J., 1729 John St., Cincinnati 14, O.
Jacuzzi Bros., Inc., 5327 Jacuzzi Ave., Richmond, Calif.
Jaden Mfg. Co., 1601 Second St., Hastings, Neb.
Jamar Co., Walker, 367 S. First Ave., E. Duluth, Minn.
Jamieson Mfg. Co., 819 Bedford, Dallas, Tex.
● Janette Mfg. Co., 556 W. Monroe St., Chicago 6, Ill.
Jarecki Mfg. Co., 1345 W. 12th St., Erie, Pa.
Jefferson Electric Co., 25th & Madison St., Bellwood, Ill.
● Jefferson Union Co., 601 W. 26th St., New York 1, N. Y.
Jeffrey Mfg. Co., 859-99 N. Fourth St., Columbus 16, O.
● Jenkins Bros., 80 White St., New York 13, N. Y.
Jenn Air Products Co., 325 Bankers Trust Bldg., Indianapolis, Ind.
Jennison Co., 17 Putnam St., Fitchburg, Mass.
Jessop Steel Co., Washington, Pa.
Jewel Mfg. Co., 1841 University Ave., St. Paul 4, Minn.
● Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Johnson Bronze Co., 460 S. Mill St., New Castle, Pa.
Johnson Co., S. T., 401 N. Broad St., Philadelphia 8, Pa.
● Johnson Corp., The, 806 Wood St., Three Rivers, Mich.
Johnson Fan & Blower Corp., 1319 W. Lake St., Chicago 7, Ill.
Johnson Gas Appliance Co., 520 "E" Ave., N. W., Cedar Rapids, Ia.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
● Johnson Service Co., 507 E. Michigan St., Milwaukee 2, Wis.
Johnston Bros., Inc., Ferrysburg, Mich.
Johnston & Chapman Co., 2925 Carroll Ave., Chicago 12, Ill.
Johnston & Jennings, 877 Addison Rd., Cleveland 14, O.
Johnston Tin Foil & Metal Co., The, 6100 S. Broadway, St. Louis 11, Mo.
Joliet Chemicals, Inc., Industry Ave., Joliet, Ill.
Jones Foundry & Machine Co., W. A., 4401 Roosevelt Rd., Chicago 24, Ill.
Jones & Laughlin Steel Corp., Third Ave. & Ross St., Pittsburgh 30, Pa.
Jordan & Co., Inc., Paul R., 311 E. South St., Indianapolis 4, Ind.
● Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Justus Steam Trap Co., Napanoch, N. Y.

K

Kainer & Co., 763 W. Lexington St., Chicago 7, Ill.
Kaiser Co., E. B., 625 Webster Ave., Chicago 14, Ill.
Kaiser Co., H. S., 3336 Franklin Blvd., Chicago, Ill.
Kaltenthaler Co., H. J., 236 Cherry St., Philadelphia 6, Pa.
Kane Mfg. Corp., Kane, Pa.
Kauffman Air Conditioning Corp., 4336 W. Pine Blvd., St. Louis 8, Mo.
● Kaufman Co., H. J., The, 13215 Roselawn Ave., Detroit 4, Mich.
Kaye & MacDonald, Inc., 88-96 Franklin Ave., West Orange, N. J.
Keashey Co., Robert A., 139-149 W. 19th St., New York, N. Y.
Keasbey & Mattison Co., Butler Ave., Ambler, Pa.
Keckley Co., O. C., 400 W. Madison St., Chicago 6, Ill.
Keeler Co., E., 238 West St., Williamsport 3, Pa.
Keeney Mfg. Co., Main St., Newington 11, Conn.
Kehm Corp., The, 135 S. La Salle St., Chicago 3, Ill.
Keller Tool Co., P. O. Box 268, Grand Haven, Mich.
Kellogg Co., M. W., The, 225 Broadway, New York 7, N. Y.
Kelley Koett Mfg. Co., The, 212 W. 4th St., Covington, Ky.
Kelvin-White Co., 90 State St., Boston 9, Mass.
Kelvinator Div., Nash-Kelvinator Corp., 14250 Plymouth Rd., Detroit 32, Mich.
● Kennard Corp., 1819 S. Hanley Rd., St. Louis 17, Mo.
● Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kerentoff, G. L., 2218 Reading Rd., Cincinnati 2, O.
Kern Co., John A., 224 N. Loomis St., Chicago 7, Ill.
Kernchen Co., 333 N. Michigan, Chicago, Ill.
Kerotest Mfg. Co., 2525 Liberty Ave., Pittsburgh 22, Pa.
Kester Solder Co., 4201 Wrightwood Ave., Chicago 39, Ill.
● Kewanee Boiler Corp., Franklin St. and "Q" Tracks, Kewanee, Ill.
● Key Co., 2625 McCasland, East St. Louis, Ill.
Keystone Asphalt Products Co., 43 E. Ohio St., Chicago 11, Ill.
Keystone Carbon Co., Inc., St. Marys, Pa.
Kidder Mfg. Co., Inc., J. F., 426 Colchester Ave., Burlington, Vt.
● Kieley & Mueller, Inc., 2015 43rd St., North Bergen, N. J.
Kimberly-Clark Corp., Neenah, Wis.
● Kinetic Chemicals, Inc., 10th & Market Sts., Wilmington 98, Del.
King Co., The, Box 178, Owatonna, Minn.
King Engineering Corp., 945 Willard Ave., Ann Arbor, Mich.
King Gauge & Mfg. Co., 114 Wallace St., New Haven, Conn.
King Union Co., Inc., Hillsgrove, R. I.
Kingsford Foundry & Machine Wks., 264 W. Second St., Oswego, N. Y.
Kingston Products Corp., 1415 N. Webster, Kokomo, Ind.
Kinney Mfg. Co., 3529 Washington St., Boston 30, Mass.
Kirk & Blum Mfg. Co., 2838-52 Spring Grove Ave., Cincinnati, O.
Kisco Boiler & Engineering Co., 3732-40 Chouteau Ave., St. Louis 10, Mo.
Klauer Mfg. Co., 9th and Washington Sts., Dubuque, Ia.
Kleenaire Corp., 409 Jefferson St., Stevens Point, Wis.
Kleen-Heet, Inc., 1823 Carroll Ave., Chicago 12, Ill.
Klenk's Aviation Snips, 107 E. 5th St., Wilmington, Del.
Klingerit, Inc., 16-22 Hudson St., New York 13, N. Y.
Klipfel Mfg. Co., 1000 Weiler Ave., Hamilton, O.
Klomparens Lock-Joint Mfg. Co., Inc., 4600 Bowen Rd., S. E., Washington 19, D. C.
Kluegel & Co., E., 187 W. Kellogg Blvd., St. Paul, Minn.
Knickerbocker Co., 603 Liberty St., Jackson, Mich.
Knight, Maurice A., Kelly Ave., Akron 9, O.
Knowles Mushroom Ventilator Co., 583 Upper Mountain Ave., Upper Montclair, N. J.
Kohler Co., P. O. Box A, Kohler, Wis.
Kol-Master Corp., 161 Walberg St., Oregon, Ill.
Kold-Hold Mfg. Co., Lansing 4, Mich.
Kopperman & Sons, Joseph, 316 New St., Philadelphia 6, Pa.
Koppers Co., Inc., Bartlett Hayward Div., 200 Scott St., Baltimore 3, Md.
Koppers Co., Inc., Tar Products Div., Koppers Bldg., Pittsburgh 19, Pa.
Korfund Co., Inc., 48-36 32nd Pl., Long Island City 1, N. Y.
Koven & Bro., L. O., Inc., 154 Ogden Ave., Jersey City 7, N. J.
Kraissl Co., Inc., The, Terhune and Williams Aves., Hackensack, N. J.
Kramer Trenton Co., N. Olden & Bruening Aves., Trenton 5, N. J.
Krehbiel Co., J. H. 425 N. Crawford Ave., Chicago, Ill.
Kresno-Stamm Mfg. Co., (America), Inc., 345 Commercial Ave., Palisades Park, N. J.
Krez Co., Paul J., 444 N. LaSalle St., Chicago, Ill.
● Krueger Sentry Gauge Co., 1056 W. Mason St., Green Bay, Wis.
Kuhns Bros. Co., Dayton 1, O.
Kunkle Valve Co., 121 S. Clinton St., Ft. Wayne 2, Ind.
Kwikon Co., 1850 W. Washington, Chicago 12, Ill.

L

La Bour Co., Inc., The, 1301 Sterling Ave., Elkhart, Ind.
Laclede-Christy Clay Products Co., 411 N. Seventh St., St. Louis 1, Mo.
Laclede Steel Co., Arcade Bldg., Rm. 1317, St. Louis 1, Mo.
LaClede Stoker Co., 4438 Hunt Ave., St. Louis 10, Mo.
La Crosse Steel Roofing & Corrugating Co., 227 Jay St., La Crosse, Wis.
La Crosse Tractor Co., La Crosse, Wis.
● Ladish Co., 5300 S. Packard Ave., Cudahy, Wis. (Milwaukee Suburb).
Lake Chemical Co., 607 N. Western Ave., Chicago 12, Ill.
Lamb Electric Co., Kent, O.
Lamb & Ritchie Co., 250 Albany St., Cambridge, Mass.
Lammert & Mann Co., 221 N. Wood St., Chicago 12, Ill.
Lamson & Sessions Co., 1971 W. 85th St., Cleveland, O.
Lamson Corp., Syracuse 1, N. Y.
Lancaster Heat Transfer Co., Inc., 123 DeKalb Ave., Brooklyn, N. Y.
Landis & Gyr, Inc., 104 Fifth Ave., New York 11, N. Y.
Landis Machine, Inc., Fifth and Church Sts., Waynesboro, Pa.
Larkin Coils, 519 Memorial Dr., S. E., Atlanta 1, Ga.
Larkin Packer Co., 6200 Maple Ave., St. Louis 14, Mo.
Lastik Products Co., Inc., 1106 Keenan Bldg., Pittsburgh 22, Pa.
Lau Blower Co., 2001 Home Ave., Dayton 7, O.
Lawler Automatic Controls, Inc., 453 N. MacQuesten Pkwy., Mount Vernon, N. Y.
Lawrence Pump & Engine Co., P. O. Box 70, Lawrence, Mass.
● Layne & Bowler, Inc., Box No. 215, Hollywood Sta., Memphis 8, Tenn.
Leach Relay Co., 5919 Avalon Blvd., Los Angeles 3, Calif.
Lead Lined Iron Pipe Co., 1 Broadway, Wakefield, Mass.
Leavitt Machine Co., East River St., Orange, Mass.
Lecourtenay Co., 5 Maine St., Newark 5, N. J.
Lee Co., K. O., Aberdeen, S. D.
Lee Engineering Co., Union National Bank Bldg., Youngstown 3, O.
Lee & Son, Thomas, 128-132 W Second St., Cincinnati 2, O.
Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa.
Lees, John, Div., The, Serrick Corp., Muncie, Ind.
Leffel & Co., James, 426 East St., Springfield, O.
Lehigh Fan & Blower Co., Front & Linden Sts., Allentown, Pa.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Lehon Co., The, 4411 S. Oakley Ave., Chicago, Ill.
Leinweber Propellers, 8448 Crandon, Chicago, Ill.
Leland Electric Co., 1501 Webster St., Dayton 1, O.
Lenk Mfg. Co., 30 Cummington St., Boston 15, Mass.
Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y., and Columbus, Ohio
Leonard Precision Products Co., 1100 Larson Ave., Garden Grove, Calif.
Leonard Valve Co., Elmwood Station, Providence 7, R. I.

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Leslie Co., Valley Brook & Grant Aves., Lyndhurst, N. J.
Leslie Welding Co., 2943 Carroll Ave., Chicago 12, Ill.
Levow, David, 308 W. 20th St., New York 11, N. Y.
Lewellen Mfg. Co., Columbus, Ind.
● Lewin-Mathes Co., Lewin Metals Div., 1111 Chouteau Ave., St. Louis 2, Mo.
Lewis & Co., Inc., Chas. S., 2207 Pine St., St. Louis 3, Mo.
Lewis & Co., Joseph E., 1319 Carroll St., Baltimore, Md.
Leyman Mfg. Corp., John H. McGowan Co. Div., 1416 First National Bank Bldg., Cincinnati 2, O.
Libbey-Owens-Ford Glass Co., Nicholas Bldg., Toledo 3, O.
Liberty Motors & Engineering Corp., Coolidge & Constance Aves., Arbutus, Baltimore 29, Md.
Lilie-Hoffman Cooling Towers, Inc., 4239 Duncan Ave., St. Louis 10, Mo.
Lincoln Electric Co., The, 12818 Coit Rd., Cleveland 1, O.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Lindsay Corp., The, 1740 25th Ave., Melrose Park, Ill.
Linear Incorporated, N. W. Cor. State Rd. & Levick St., Philadelphia 35, Pa.
Link-Belt Co., 307 N. Michigan Ave., Chicago 1; 300 W. Pershing Rd., Chicago 9, and 2410 W. 18th St., Chicago 8, Ill.; 519 N. Holmes Ave. and 220 S. Belmont Ave., Indianapolis 6, Ind., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Lintern Co., 60 Lincoln Ave., Berea, O.
Lion Mfg. Corp., 2701-11 Belmont Ave., Chicago, Ill.
Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23, Ill.
Liquid Conditioning Corp., 114 E. Price St., Linden, N. J.
Liquidometer Corp., 37-15 Skillman Ave., Long Island City 1, N. Y.
Lissberger & Son, Inc., Marks, 23-01 Borden Ave., Long Island City, N. Y.
Lithgow Corp., 333 W. 40th Pl., Chicago 9, Ill.
Little Mfg. Co., M. S., 151 New Park Ave., Hartford 6, Conn.
Littleford Bros., Inc., 453 E. Pearl St., Cincinnati 2, O.
Livingstone Engineering Co., 120 Milk St., Boston 9, Mass.
Locke Regulator Co., Walter and Osborne Sts., Salem, Mass.
Lockformer Co., The, 4615 Arthington St., Chicago, Ill.
Lockjoint Wood Products Co., 1114 S. Santa Fe, Wichita 11, Kan.
Locknut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Lodge & Shipley Machine Tool Co., 805 Evans St., Cincinnati 4, O.
Logan Engineering Co., Lawrence & Lamon Ave., Chicago 30, Ill.
Loline Steel Boiler Co., 235 Penn St., Allentown, Pa.
Lonergan Co., J. E., 2nd and Race Sts., Philadelphia 6, Pa.
Lonergan Mfg. Co., Albion, Mich.
Long Mfg., Div. Borg-Warner Corp., 12501 Dequindre St., Detroit, Mich.
Lookout Boiler & Mfg. Co., Congress St. & Mfrs. Rd., Chattanooga 1, Tenn.
● Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.
Louisville Drying Machinery Co., 351 Baxter Ave., Louisville, Ky.
Lovejoy Flexible Coupling Co., 5024 W. Lake St., Chicago 44, Ill.
Lowell Wrench Co., 54 Commercial St., Worcester 8, Mass.
Loyal Knight Stokers, Inc., 800 Scheel St., Belleville, Ill.
Ludlow Valve Mfg. Co., Inc., Foot of Adams St., Troy, N. Y.
Lukens Steel Co. and Divisions, 308 S. First Ave., Coatesville, Pa.
Lumm Co., A. H., 2512 Albion St., Toledo 6, O.
Lumsden & Van Stone, Div. of Midwest Piping & Supply Co., 426 First St., South Boston 27, Mass.
● Lunkenheimer Co., Waverly & Beekman Sts., Cincinnati 14, O.
Lustra Corp. of America, 40 W. 25th St., New York 10, N. Y.
Luzerne Rubber Co., Muirhead Ave., Trenton 9, N. J.
Lynch Mfg. Corp., 3600 Summit St., Toledo 1, O.
Lynchburg Foundry Co., Peoples Bank Bldg., Lynchburg, Va.
Lyon, Conklin & Co., Inc., McComas & Race Sts., Baltimore 30, Md.

M

M B Mfg. Co., Inc., The, 1060 State St., New Haven 11, Conn.
Maas & Waldstein Co., 438 Riverside Ave., Newark 4, N. J.
Machine-Craft Mfg. Co., 3805 Avalon Blvd., Los Angeles, Calif.
MacDermid Chemical Co., Bristol, Conn.
Macksons Co., 125 Cedar St., New York 6, N. Y.
MacLean-Fogg Lock Nut Co., 2653 N. Kildare, Chicago 39, Ill.
Magirl Foundry & Furnace Co., 413 E. Oakland Ave., Bloomington, Ill.
Magnetrol, Inc., 2110 S. Marshall Blvd., Chicago 23, Ill.
MagniLastic Div., Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.
Mahon Co., R. C., 8650 Mt. Elliott Ave., Detroit, Mich.
● Maid-O'-Mist, Inc., 3215 N. Pulaski Rd., Chicago 41, Ill.
Maintenance Engineering Corp., 3611 Clinton Dr., Houston, Tex.
Majestic Co., 733 Erie St., Huntington, Ind.
Majot Automatic Machine Co., Inc., 88 Main St., East Orange, N. J.
Mall Tool Co., 7740 S. South Chicago Ave., Chicago 19, Ill.
Malleable Iron Fittings Co., Branford, Conn.
Mallory Sales Co., 13904 Lincoln Ave., Dolton, Ill.
Manhattan Perforated Metal Co., Inc., 43-17 37th St., Long Island City 1, N. Y.
Manheim Mfg. & Belting Co., Manheim, Pa.
Manitowoc Boiler Wks., 16th & The River, Manitowoc, Wis.
Manning, Maxwell & Moore, Inc., Bridgeport 2, Conn.
Mansfield & Green, 1051 Power Ave., Cleveland 14, O.
Manufacturers Fin Coil Co., 2505 S. Pulaski Rd., Chicago 23, Ill.
Manufacturers Machine Co., Railroad Ave., North Andover, Mass.
Maplewood Machinery Co., Inc., 2634 Fullerton Ave., Chicago 47, Ill.
Marathon Electric Mfg. Corp., Cherry and Randolph Sts., P. O. Box 298, Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Marcliff, Inc., 1702 Summit St., Toledo, O.
Marco Co., Inc., 3rd & Church Sts., Wilmington 50, Del.
Marion Machine Foundry & Supply Co., Marion, Ind.
● Marley Co., Inc., The, 3001 Fairfax Rd., Kansas City 15, Kans.
Marlin-Rockwell Corp., Jamestown, N. Y.
● Marlo Coil Co., 6135 Manchester Ave., St. Louis 10, Mo.
Marman Products Co., Inc., 940 W. Redondo Blvd., Inglewood, Calif.
Marquette Mfg. Co., 401 Johnson St., Minneapolis, Minn.
Marsh Corp., Jas. P., 3501 Howard St., Skokie, Ill.
Marsh Heating Equipment Co., Div. of Jas. P. Marsh Corp., 3501 Howard St., Skokie, Ill.
Marsh Valve Co., 4th St., & Brigham Rd., Dunkirk, N. Y.
Marshalltown Mfg. Co., 901 E. Nevada, Marshalltown, Ia.
Martens & Stormoen, 15 Hathaway St., Boston 10, Mass.
Martin Co., Inc., J. O., 637 Minna St., San Francisco, Calif.
Martin Fan & Blower Co., 4634 W. 21st Pl., Chicago 50, Ill.
Martin & Sons, H. P., 801 W. 12th St., Owensboro, Ky.
● Martocello & Co., Jos. A., 229 N. 13th St., Philadelphia 7, Pa.
Masonite Corp., 111 W. Washington St., Chicago 2, Ill.
Mason-Neilan Regulator Co., 1190 Adams St., Boston 24, Mass.
Master Electric Co., 126 Davis Ave., Dayton 1, O.
Matthiessen & Hegeler Zinc Co., 9th & Sterling Sts., La Salle, Ill.
Maurath, Inc., 21800 Miles Ave., Cleveland 22, O.
Maurey Mfg. Corp., 2911 S. Wabash Ave., Chicago 16, Ill.
May Oil Burner Div., Gerotor May Corp., Maryland Ave. and Oliver, Baltimore 3, Md.
Mayflower Air-Conditioners, Inc., Duluth Ave. and E. 7th St., St. Paul 6, Minn.
Mayflower Products, Inc., 13 S. Fifth St., Richmond, Ind.
Mayne Products Co., 324 Harries Bldg., Dayton 2, O.
Mayson Mfg. Co., Inc., 4332 Horatio St., Detroit 10, Mich.
Maysteel Products, Inc., 135 W. Wells St., Milwaukee 3, Wis.
McAlear Mfg. Co., 1921 S. Western Ave., Chicago 8, Ill.
McAuley Trap Co., 405 Penn Ave., Pittsburgh 22, Pa.
● McCord Corp., 2587 E. Grand Blvd., Detroit 11, Mich.
McCorkle Co., D. H., 6th & Bancroft Way, Berkeley 2, Calif.
● McDonnell & Miller, Inc., Wrigley Bldg., 400 N. Michigan Ave., Chicago 11, Ill.
McIntire Connector Co., 263 Jefferson St., Newark 5, N. J.
McIntyre Div., Eastern Industries, 15 Riverdale Ave., Newton 58, Mass.
McKay Co., 1005 Liberty Ave., Pittsburgh 22, Pa.
McLeod & Henry Co., Inc., Troy, N. Y.
McPherson Furnace & Supply Co., 1805 N. E. Second Ave., Portland 12, Ore.
● McQuay, Inc., 1600 Broadway, N. E., Minneapolis 13, Minn.
McQuay-Norris Mfg. Co., Southwest Ave. at Marconi, St. Louis 10, Mo.
McRay Sales Co., 1156 E. Colorado St., Pasadena 1, Calif.
McWane Cast Iron Pipe Co., 1201 Vanderbilt Rd., Birmingham 2, Ala.
Mears-Kane-Ofeldt, Inc., 1903-1915 E. Hagert St., Philadelphia 25, Pa.
Mechanical Industries Production Co., 217-223 Ash St., Akron 3, O.
Mechanical Products Corp., 168 N. Ogden Ave., Chicago 7, Ill.
Meco, Inc., Ft. of S. W. Woods St., P. O. Box 1610, Portland 7, Ore.
Medart Co., 100 Potomac St., St. Louis 18, Mo.
Meier Co., Joshua, 36 E. 10th St., New York, N. Y.
Meier Electric & Machine Co., Inc., 3525 E. Washington St., Indianapolis 7, Ind.
Mel Supply Co., The, 554 Chapel St., New Haven, Conn.
Meletron Corp., 950 N. Highland Ave., Los Angeles 38, Calif.
Mel-Gauge Co., Crest Ave., East Haven, Conn.
Mellish & Murray Co., 1715 Carroll Ave., Chicago 12, Ill.
Merchant & Evans Co., 2035 Washington Ave., Philadelphia 46, Pa.
● Mercoid Corp., The, 4201 Belmont Ave., Chicago 41, Ill.
Mercontrol Inc., 278 Pearl St., New York 7, N. Y.
Mercury Clutch Div., Automatic Products Corp., Canton 6, O.
Meriam Instrument Co., The, 10920 Madison Ave., Cleveland 2, O.
Mesker Steel Corp., Geo. L., 400 N. W. First St., Evansville 8, Ind.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Metallo Gasket Co., 16 Bethany St., New Brunswick, N. J.
Metropolitan Refining Co., Inc., 50-23 Twenty-Third St., Long Island City 1, N. Y.
● Mettler Co., Lee B., 406 S. Main St., Los Angeles 13, Calif.
Meyer & Bro. Co., F., 1313 S. Adams St., Peoria 2, Ill.
Meyer Furnace Co., The, P. O. Box 989, Peoria 1, Ill.
Meyer Mfg. Co., 2536 Fourteenth St., Detroit 16, Mich.
Micheli Air Conditioning Co., Inc., 1725 State St., Schenectady, N. Y.
Michigan Pipe Co., 506 Phoenix Bldg., Bay City, Mich.
Micro Products Co., 20 N. Wacker Dr., Chicago 6, Ill.
Micro Switch Div. of First Industrial Corp., 1 E. Spring St., Freeport, Ill.
Midco Register Corp., 1059 Grand Ave., St. Paul, Minn.
Mid-Continent Metal Products Co., 1960 Clybourn Ave., Chicago 14, Ill.
Midland Paint & Varnish Co., 9115 Reno Ave., Cleveland, O.
Mid-States Equipment Co., 2429 S. Michigan Ave., Chicago 16, Ill.
Midwest Piping & Supply Co., Inc., 1450 S. Second St., St. Louis 4, Mo.
Midwest Products Co., Port Byron, Ill.
Miller Electric Mfg. Co., Inc., 718 S. Bounds St., Appleton, Wis.
Miller-Harris Instrument Co., 1434 W. Atkinson Ave., Milwaukee 6, Wis.
Millers Falls Co., 57 Wells St., Greenfield, Mass.
Mills Corp., Elmer E., 153-159 W. Huron St., Chicago 10, Ill.
Mills Industries, Inc., 4110 W. Fullerton Ave., Chicago, Ill.
Milwaukee Gas Specialty Co., P. O. Box 461, Milwaukee, Wis.
Milwaukee Valve Co., S. Burrell St. at E. Hayes Ave., Milwaukee 7, Wis.
Mineral Insulation Co., 103rd & Southwest Highway, Chicago Ridge, Ill.
● Minerallac Electric Co., 25 N. Peoria St., Chicago 7, Ill.
Minimite Co., 623 S. Kildare Ave., Chicago 24, Ill.
● Minneapolis-Honeywell Regulator Co., 2604 4th Ave., S., Minneapolis 8, Minn.

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Minn-Kota Foundry & Mfg. Co., P. O. Box 822, Fargo, N. D.
Miracle Adhesives Corp., 801 Second Ave., New York 17, N. Y.
Mir-O-Col Alloy Co., 2416 E. 53rd St., Los Angeles 11, Calif.
Misener Mfg. Co., Inc., 200-8 Walton St., Syracuse 2, N. Y.
Mission Appliance Corp., 7101 McKinley Ave., Los Angeles 1, Calif.
Mississippi Glass Co., 200 Fifth Ave., New York 10, N. Y.
Mitchell & Co., Inc., W. K., 29th & Ellsworth, Philadelphia 46, Pa.
Mitchell Mfg. Co., 2525 N. Clybourn Ave., Chicago, Ill.
Modern Engineering Co., 3411 Pine Blvd., St. Louis 3, Mo.
● Modine Mfg. Co., 1506 De Koven Ave., Racine, Wis.
Moeller Instrument Co., 132nd St. & 89th Ave., Richmond Hill 18, N. Y.
Moeschl-Edwards Corrugating Co., Inc., The, P. O. Box 1115, Cincinnati 1, O.
Moloch Foundry & Machine Co., Kaukauna, Wis.
Monarch Mfg. Works, Inc., 2501 E. Ontario St., Philadelphia 34, Pa.
Monash-Younger Co., Inc., 1315 W. Congress St., Chicago 7, Ill.
Moncrief Furnace Co., P. O. Box 1673, Atlanta 1, Ga.
Monitor Controller Co., The, 51 S. Gay St., Baltimore 2, Md.
Monogram Combustion Chamber Co., 731 N. 35th St., Philadelphia 4, Pa.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Monsanto Chemical Co., Merimac Div., Everett Sta., Boston 49, Mass.
Montag Stove & Furnace Wks., 2011 N. Columbia Blvd., Portland 3, Ore.
Montgomery Bros., 1122 Howard St., San Francisco, Calif.
Moore Co., Goodloe E., 603 N. Gilbert St., Danville, Ill.
● Moore Co., The, 544 Westport Rd., Kansas City, Mo.
Moore Products Co., H and Lycoming Sts., Philadelphia 24, Pa.
Moraine Products Div., General Motors Corp., Dayton 1, O.
Moran Flexible Joint Co., 217 W. Main St., Louisville, Ky.
Morehead Mfg. Co., 2455 W. Warren Ave., Detroit 8, Mich.
Morey, Dan, Box 85, Los Angeles 35, Calif.
Morf Industries, Inc., 780 Manor Rd., Staten Island 2, N. Y.
Morris Machine Wks., 50 E. Genesee St., Baldwinsville, N. Y.
Morrison Brothers Co., Dubuque, Ia.
Morrison Products, Inc., E. 168th St. and Waterloo Rd., Cleveland 10, O.
Morse Chain Co., Turner Pl., Ithaca, N. Y.
Morse-Smith-Morse, Inc., 165 Dexter Ave., Watertown 72, Mass.
Mortell Co., J. W., Kankakee, Ill.
Morton Associates, Inc., Henry J., 20532 W. 8-Mile Rd., Detroit 19, Mich.
Motionair Co., 3319 E. Slauson Blvd., Los Angeles 11, Calif.
Mouat Vapor Heating Co., The, 1246-1254 W. 4th St., Cleveland 13, O.
● Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Mountain States Equipment Co., 1238 Speer Blvd., Denver 4, Colo.
Mueller Brass Co., Port Huron, Mich.
Mueller Co., 512 W. Cerro Gordo St., Decatur 70, Ill.
Mueller Furnace Co., L. J., 2005 W. Oklahoma Ave., Milwaukee 7, Wis.
Mueller Steam Specialty Co., Inc., 40-20 22nd St., Long Island City 1, N. Y.
Multi-Cell Sales Corp., 3420 Nicollet Ave., Minneapolis 8, Minn.
Muncie Gear Wks., Inc., 700 N. Wysor, Muncie, Ind.
● Mundet Cork Corp., 7101 Tonnelle Ave., North Bergen, N. J.
Mundt & Sons, Charles, 53 Fairmount Ave., Jersey City 4, N. J.
Munn & Steele, Inc., 130 Lister Ave., Newark 5, N. J.
Munton Mfg. Co., 9400 Belmont Ave., Franklin Park, Ill.
Murray Iron Wks. Co., 1106 Washington St., Burlington, Ia.
● Murray Mfg. Co., D. J., 1002-24 Third St., Wausau, Wis.
Mutual Chemical Co. of America, 270 Madison Ave., New York 16, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
Myers Electric Co., Inc., 209 First Ave., Pittsburgh 22, Pa.
Mystik Adhesive Products Div., Chicago Show Printing Co., 2635 N. Kildaire, Chicago 39, Ill.

N

Naco Mfg. Co., Box 310, Huntington Park, Calif.
● Nash Engineering Co., 307 Wilson Ave., South Norwalk, Conn.
Nason Co., 7663 Epworth Blvd., Detroit 4, Mich.
● Nat Corp., 2710 McGee St., Kansas City, Mo.
National Acme Co., The, 131st & Chapin St., Cleveland, O.
National Airoil Burner Co., Inc., 1284 E. Sedgley Ave., Philadelphia 34, Pa.
National Aluminate Corp., 6215 W. 66th Pl., Chicago 38, Ill.
National Carbon Co., 30 E. 42nd St., New York 17, N. Y.
National Cylinder Gas Co., 840 N. Michigan Ave., Chicago 11, Ill.
National Engineering & Mfg. Co., 519 Wyandotte, Kansas City 6, Mo.
National Engineering Products, Inc., Commerce and Savings Bldg., Washington, D. C.
National Gas Burners, Div. of Mid-Continent Metal Products Co., 1960 Clybourn Ave., Chicago 14, Ill.
National Gas Equipment Co., Inc., Terrell, Tex.
National Gypsum Co., Delaware Ave., Buffalo, N. Y.
National Heater Co., 2182 Cleora Ave., St. Paul 4, Minn.
National Lead Co., 111 Broadway, New York 6, N. Y.
National Lining Co., 326 W. Washington, Chicago, Ill.
National Lock Co., Inc., 1902 Seventh St., Rockford, Ill.
National Machine Wks., 122 S. Michigan Ave., Chicago 3, Ill.
National Mfg. Corp., 151 Fillmore Ave., Tonawanda, N. Y.
National Metal Fabricators, 2138 S. Sawyer, Chicago 23, Ill.
National Meter Co., 4221 First Ave., Brooklyn 32, N. Y.
National Oil Burner Co. of N. Y. Inc., 614 Bergen St., Brooklyn, N. Y.
National Pipe Bending Co., 122 River St., New Haven 13, Conn.
National Pumpless Blowtorch Co., 7500 Stanton Ave., Cleveland, O.
National Radiator Co., The, 221 Central Ave., Johnstown, Pa.
National Steam Pump Co., 701 W. Johnson St., Upper Sandusky, O.
National Time & Signal Corp., 21800 Wyoming Ave., Detroit 20, Mich.
National Tube Co., United States Steel Corp., Subsidiary, Frick Bldg., Pittsburgh 30, Pa.
National Valve & Mfg. Co., 3101 Liberty Ave., Pittsburgh 1, Pa.
Naugatuck Mfg. Co., Union City, Conn.
● Naylor Pipe Co., 1251 E. 92nd St., Chicago 19, Ill.
Nebel Mfg. Co., P. O. Box 3942, Shaker Square Sta., Cleveland 20, O.
Neilson Chemical Co., 6564 Benson Ave., Detroit 7, Mich.
Nelson Chemical Pumps, Box 2235, Casper, Wyo.
● Nelson Corp., Herman, 1824 Third Ave., Moline, Ill.
Nelson Mfg. Co. B. F., 401 Main St., N. E., Minneapolis 13, Minn.
Nelson Specialty Welding Equipment Corp., 440 Peralta Ave., San Leandro, Calif.
Neptune Meter Co., 50 W. 50th St., New York 20, N. Y.
● Nesbitt, Inc., John J., State Rd. & Rhawn St., Philadelphia 36, Pa.
● Nevinger Mfg. Co., Inc., Greenville, Ill.
New Albany Machine Mfg. Co., E. 10th & Water Sts., New Albany, Ind.
New Departure Div., General Motors Corp., Bristol, Conn.
● New England Cooling Tower Co., 89 Broad St., Boston 10, Mass.
New Haven Copper Co., Seymour, Conn.
New Jersey Zinc Sales Co., Front & Fletcher Sts., New York 7, N. Y.
New York Air Valve Corp., 611-621 Broadway, New York, N. Y.
New York Blower Co., 3159 Shields Ave., Chicago 16, Ill.
New York Brass Foundry, 405 Broome St., New York, N. Y.
Newark Boiler Regulator Co., Inc., 15 Ward St., Bloomfield, N. J.
Newark Wire Cloth Co., 351 Verona Ave., Newark 4, N. J.
Newcomb Engineering Co., 526-28 Monroe Ave., Grand Rapids 2, Mich.
Newman Brothers, Inc., 666 W. Fourth St., Cincinnati, O.
Newman Co., Inc., I. C., 6 E. 45th St., New York, N. Y.
Newport Rolling Mill Co., Div. National Detrola Corp., Ninth & Lowell Sts., Newport, Ky.
Niagara Blower Co., 6 E. 45th St., New York 17, N. Y.
Niagara Machine & Tool Wks., 637-697 Northland Ave., Buffalo 11, N. Y.
Nice Ball Bearing Co., 30th and Hunting Park Ave., Philadelphia 40, Pa.
● Nicholson & Co., W. H., 198 Oregon St., Wilkes-Barre, Pa.
Niles Rolling Mill Co., Niles, O.
Noera Mfg. Co., Div. Chase Brass & Copper Co., Waterbury 91, Conn.
Nooter Boiler Works Co., John, 1400 S. Second St., St. Louis 4, Mo.
Nordstrom Valve Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Norgren Co., C. A., 222 Santa Fe Dr., Denver 9, Colo.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Norman Products Co., Inc., 1150 Chesapeake Ave., Columbus, O.
Norristown Magnesia & Asbestos Co., Washington St., Norristown, Pa.
North American Fibre Products Co., The, Standard Bldg., Cleveland 13, O.
North American Mfg. Co., 4455 E. 71st St., Cleveland, O.
North American Phillips Co., Inc., 100 E. 42nd St., New York 17, N. Y.
North Penn Co., 32 E. 21st St., New York 10, N. Y.
Northern Blower Co., 6409 Barberton Ave., Cleveland 2, O.
Northern Equipment Co., 1945 Grove Drive, Erie 6, Pa.
Northern Indiana Brass Co., 935 Plum St., Elkhart, Ind.
Northern Steel & Stoker Corp., 3100 Prospect Rd., Peoria 4, Ill.
Northern Weatherstrip Co., 367 S. First Ave., E. Duluth, Minn.
Northwest Foundry & Furnace Co., 2345 S. E. Gladstone St., Portland 2, Ore.
Northwest Lead Co., 2700 16th Ave., S. W., Seattle 4, Wash.
Norwin Co., E. Album St., Freeport, Ill.
Norwood Filtration Co., The, N. Maple St., Florence, Mass.
Nu-Way Corp., The, 2416 4th Ave., Rock Island, Ill.
Nye Tool & Machine Co., 4120-30 Fullerton Ave., Chicago 39, Ill.

O

OPW Corp., 2735 Colerain Ave., Cincinnati 25, O.
Oakite Products, Inc., 22 Thames St., New York 6, N. Y.
Obear, E. L., 10224 S. Figueroa St., Los Angeles, Calif.
Oberdorfer Industries, Inc., 3007 Thompson Rd., Syracuse, N. Y.
O'Brien Corp., The, South Bend 21, Ind.
O'Brien Steam Specialty Co., Inc., 388 Erie Blvd., W., Syracuse 4, N. Y.
O'Brien Industries, 157 Myrtle Ave., Jersey City, N. J.
Ohio Brass Co., 380 N. Main St., Mansfield, O.
Ohio Electric Mfg. Co., 5925 Maurice Ave., Cleveland 4, O.
● Ohio Injector Co., 275 Main St., Wadsworth, O.
Ohio Pipe Bending & Machine Co., 3900-3910 Trent Ave., Cleveland 9, O.
Ohio Products Co., 16113 Munn Rd., Cleveland 11, O.
Ohl & Son, George A., 159 Oraton St., Newark, N. J.
Ohmlac Paint & Refining Co., 92 Liberty St., New York 6, N. Y.
Oil Heat Master National Sales, 4269-81 Park Ave., New York 57, N. Y.
Oil Well Supply Co., Oil City, Pa.
Olsen Testing Machine Co., Tinius, 12th and Buttonwood Sts., Philadelphia, Pa.
O'Malley Valve Co., Edward, 231 E. 95th St., Chicago, Ill.
O'Neil Irwin Mfg. Co., 800 Jefferson, Lake City, Minn.
Ormsby-Osterman, Inc., 3631 Cass Ave., St. Louis 13, Mo.
Orr & Sembower, Inc., Box 1138, Reading, Pa.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Oster Mfg. Co., 2057 E. 61st Pl., Cleveland 3, O.
Ostlind Valve, Inc., 601 N. E. 28th Ave., Portland 12, Ore.
OverSpred Stoker Co., 77 Washington St., Suite 1702, Chicago 2, Ill.
● Owens-Corning Fiberglas Corp., 1911 Nicholas Bldg., Toledo 1, O.

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Ozalid Products Div., General Aniline & Film Corp., Ansco Rd., Johnson City, N. Y.
Ozone Air Co., 1132 Division Ave., S., Grand Rapids 7, Mich.
Ozo-Ray Products Mfg. Co., Div. of Lidgerwood Mfg. Co., 7 Dey St., New York, N. Y.

P

Pacific Engineering Equipment Co., P. O. Box 1009, Glendale 5, Calif.
Pacific Lumber Co., The, 100 Bush St., San Francisco 4, Calif.
Pacific Mfg. Corp., 5308 Blanche Ave., Cleveland, O.
● Pacific Pumping Co., 960 Howard St., San Francisco, Calif.
Pacific Pumps, Inc., 5716 Bickett St., Huntington Park, Calif.
Pacific States Felt & Mfg. Co., Inc., 845 Howard St., San Francisco, Calif.
● Pacific Steel Boiler Div., United States Radiator Corp., 300 Buhl Bldg., Detroit 31, Mich.
Pacific Tube Co., 5710 Smithway St., Los Angeles 22, Calif.
Packless Metal Products Corp., 31 Winthrop Ave., New Rochelle, N. Y.
Page Steel & Wire, Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Paine Co., 2951 W. Carroll Ave., Chicago 12, Ill.
Pains Fireworks Display Co., Inc., 11 Park Pl., New York 7, N. Y.
Palmer Co., 2501 Norwood Ave., Cincinnati (Norwood) 12, O.
Palmer Electric Co., 20 Sproat St., Detroit 1, Mich.
Palmer Mfg. Corp., 2200 W. Filmore St., Phoenix, Ariz.
Palnut Co., 73 Cordier St., Irvington, N. J.
Pan-American Engineering Co., 820 Parker St., Berkeley 2, Calif.
Panelyte Div., St. Regis Paper Co., 230 Park Ave., New York 17, N. Y.
Pangborn Corp., 400 Pangborn Blvd., Hagerstown, Md.
Pan-L-Heat Corp., 2838 N. E. Columbia Blvd., Portland, Ore.
Paraffine Companies, Inc., 475 Brannan St., San Francisco 19, Calif.
Paragon Electric Co., Two Rivers, Wis.
Paragon-Revolute Corp., 61 South Ave., Rochester 4, N. Y.
Paramount Products Co., 545 Fifth Ave., New York, N. Y.
Parker Appliance Co., The, 17325 Euclid Ave., Cleveland 12, O.
Parker Mfg. Corp., 2200 Colorado Ave., Santa Monica, Calif.
Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.
Parks-Cramer Co., P. O. Box 444, Fitchburg, Mass.
Patent Novelty Co., 312 Eighth St., Fulton, Ill.
Patrol Valve Co., The, 2310 E. Superior Ave., Cleveland 14, O.
Patten Co., J. V. 500 De Kalb Ave., Sycamore, Ill.
Patterson-Ballagh Corp., 1900 E. 65th St., Los Angeles, Calif.
● Patterson-Kelley Co., Inc., The, 107 Warren St., East Stroudsburg, Pa.
Paul-Lewis Laboratories, Inc., 4253 N. Port Washington Rd., Milwaukee 12, Wis.
Payne Furnace Co., 336-338 N. Foothill Rd., Beverly Hills, Calif.
Peabody Engineering Corp., 580 Fifth Ave., New York 19, N. Y.
Pease Co., C. F., The, 2601 W. Irving Park Rd., Chicago 18, Ill.
Peck & Harvey, 5736 N. Western Ave., Chicago 45, Ill.
Peck, Stow & Wilcox Co., Center St., Southington, Conn.
Pecora Paint Co., Inc., 4th St., and Penna. R. R., Philadelphia 40, Pa.
● Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.
Peerless of America, Inc., 2901 Lawrence Ave., Chicago 25, Ill.
Peerless Electric Co., 3021 W. Market St., Warren, O.
Peerless Mfg. Corp., 1400 W. Ormsby St., Louisville, Ky.
● Peerless Pump Div., Food Machinery Corp., 301 West Ave., 26, Los Angeles 31, Calif.
Peerless Unit Ventilation Co., Inc., 810 Union Ave., Bridgeport, Conn.
Penberthy Injector Co., 1242 Holden Ave., Detroit 2, Mich.
Penetone Co., The, Tenafly, N. J.
Penflex Sales Co., Div. of Pennsylvania Flexible Metallic Tubing Co., 72nd St. & Powers Lane, Philadelphia 42, Pa.
Penn Brass & Copper Co., 3800 W. 20th St., Erie, Pa.
● Penn Electric Switch Co., P. O. Box 556, Goshen, Ind.
Penn Galvanizing Co., 2201 E. Tioga St., Philadelphia 34, Pa.
Penn Industrial Instrument Corp., 3116 N. 17th St., Philadelphia, Pa.
Penn Mfg. Corp. of Washington, Pa., 380 W. Chestnut St., P. O. Box 484, Washington, Pa.
Penn Ventilating Co., Goodman above Allegheny Ave., Philadelphia 40, Pa.
Pennsylvania Engineering Wks., 526 E. Jefferson St., New Castle, Pa.
Pennsylvania Forge Co., Milnor & Bleigh Sts., Philadelphia, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pennsylvania Salt Mfg. Co., Widener Bldg., Philadelphia 7, Pa.
%Proportioneers, Inc. %, 156 Codding St., Providence 1, R. I.
Perfect Circle Co., The, Hagerstown, Ind.
Perfection Grate & Stoker Co., 4 Fisk Ave., Springfield 7, Mass.
Perfection Refrigeration Parts Co., Harvey, Ill.
Perfection Stove Co., 7609 Platt Ave., Cleveland, O.
Perfex Corp., 500 W. Oklahoma Ave., Milwaukee 7, Wis.
Perkins Machine Co., 4 Perkins Ave., Warren, Mass.
Perkins & Son, Inc., B. F., Chicopee St., Holyoke, Mass.
● Permanente Products Co., Kaiser Bldg., Oakland 12, Calif.
Permatex Co., Inc., 1716-1720 Avenue Y, Brooklyn 29, N. Y.
Permutit Co., 330 W. 42nd St., New York 18, N.Y.
Perolin Co., Inc., 1112 W. 37th St., Chicago 9, Ill.
Persson Co., T. G., 224 Glenwood Ave. Bloomfield, N. J.
Peters-Dalton, Inc., 17900 Ryan Rd., Detroit 12, Mich.
Peterson Co., B. A., Dowagiac, Mich.
Petroleum Equipment Mfg. Co., 75 Brewster St., New Haven, Conn.
● Petroleum Heat & Power Co., Stamford, Conn.
Petrometer Corp., 1 Star Sq., Long Island City 1, N. Y.
Pfening Co., Fred D., The, 1075 W. 5th Ave., Columbus 12, O.
Phelps Dodge Copper Products Corp., British American Tube Div., 40 Wall St., New York 5, N. Y.
Phelps Mfg. Co., 810 Thomas St., Little Rock, Ark.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Philadelphia Gear Works, Inc., Erie Ave. & G St., Philadelphia 34, Pa.
Philadelphia Pipe Bending Co., 4135-65 N. Fifth St., Philadelphia 40, Pa.
Philadelphia Thermometer Co., 6th & Cayuga St., Philadelphia 40, P.
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.
Phillips & Co., H. A., 3255 W. Carroll Ave., Chicago 24, Ill.
Phillips Cooling Tower Co., Inc., 114 Liberty St., New York 6, N. Y.
Phoenix Brass Fittings Corp., Coit St. & Chancellor Ave., Irvington 11, N. J.
● Phoenix Mfg. Co., Joliet, Ill.
Phoenix Ventilator Co., Inc., 1665 63rd St., Brooklyn, N. Y.
Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass.
Photovolt Corp., 95 Madison Ave., New York 16, N. Y.
Pick Mfg. Co., West Bend, Wis.
Pier Equipment Mfg. Co., 1440 Milton St., Benton Harbor, Mich.
Pierce Co., Wm. B., The, 133 S. Division, Buffalo 3, N. Y.
Piezo Mfg. Corp., 110 E. 42nd St., New York 17, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Pines Engineering Co., Inc., 601 Walnut St., Aurora, Ill.
Pioneer Roofing & Sheet Metal Co., 226 N. Main St., Muskogee, Okla.
Pipe Fabrication Institute, 1108 Clark Bldg., Pittsburgh, Pa.
Piqua Machine & Mfg. Co., Piqua, O.
Piston Ring Div., Koppers Co., Inc., Bush & Hamburg Sts., Baltimore, Md.
Pittsburgh Brass Mfg. Co., 3155 Penn Ave., Pittsburgh, Pa.
Pittsburgh Corning Corp., 632 Duquesne Way, Pittsburgh 22, Pa.
Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Pittsburgh Lectrodryer Corp., 327 32nd St., Pittsburgh 30, Pa.
Pittsburgh Pipe Coil & Bending Co., 61 Bridge St., Etna 23, Pa.
● Pittsburgh Piping & Equipment Co., 43rd St., & A. V. R. R., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., 2000 Grant Bldg., Pittsburgh 19, Pa.
Pittsburgh Steel Co., Grant Bldg., Pittsburgh, Pa.
Pittsburgh Tube Co., Hagan Bldg., 323 Fourth Ave., Pittsburgh 22, Pa.
Pittsburgh Valve & Fittings Co., Barberton, O.
Pittsburgh Water Heater Corp., Box 4452, Pittsburgh 5, Pa.
Plant Rubber & Asbestos Works, 537 Brannan St., San Francisco 7, Calif.
Plasteel Products Co., McAdams Ave., Washington, Pa.
Plastergon Wall Board Co., Philadelphia Ave., Buffalo 7, N. Y.
Plastic Products Co., 6475 Georgia Ave., Detroit 11, Mich.
Pleasantaire Corp., Tower Bldg., Washington 5, D. C.
Plibrico Jointless Firebrick Co., 1800 Kingsbury St., Chicago 14, Ill.
Plumb Mfg. Co., 1925 Dwyer Ave., Utica 3, N. Y.
Plummer Spray Equipment Co., 700 Filmore St., Napoleon, O.
Plymouth Industries, Inc., 1932 Harrison Ave., Plymouth, Ind.
Pocahontas Fuel Co., Inc., Stoker Div., 340 E. 131st St., Cleveland 8, O.
Poe Co., C. W., The, Mayfield at Lee, Cleveland 18, O.
Pokorney Mfg. Co., 3117 Clybourn Ave., Chicago, Ill.
Polo Pump Co., Polo, Ill.
Poole Foundry & Machine Co., 1700 Union Ave., Woodberry, Baltimore 11, Md.
Portable Electric Tools, Inc., 255 W. 79th St., Chicago 20, Ill.
● Porter & Co., Inc., H. W., 825 Frelinghuysen Ave., Newark 5, N. J.
Positive Control Co., The, 2818 Spring Grove Ave., Cincinnati 25, O.
Potter & Brumfield Sales Co., 549 W. Washington Blvd., Chicago 6, Ill.
Powder Power Tool Corp., Ft. of S. W. Woods St., P. O. Box 1610, Portland 7, Ore.
Powder Weld Process Co., The, 419 Kent Ave., Brooklyn, N. Y.
Powell Co., Wm., The, 2525 Spring Grove Ave., Cincinnati 22, O.
Power Engineering Co., 2112 N. Southport Ave., Chicago 14, Ill.
Power Piping Div., Blaw Knox Co., 829 Beaver Ave., Pittsburgh 12, Pa.
Powermatic Ventilator Co., 4019 Prospect Ave., Cleveland 3, O.
Powers Regulator Co., 2759 Greenview Ave., Chicago 14, Ill.
Prat-Daniel Corp., Port Chester, N. Y.
Precision Scientific Co., 3737 Cortland St., Chicago 47, Ill.
Precision Thermometer & Instrument Co., 1488 Brandywine St., Philadelphia 30, Pa.
Precision Welder & Machine Co., 138 E. McMicken Ave., Cincinnati 10, O.
Preferred Utilities Mfg. Corp., 1860 Broadway, New York 23, N. Y.
Presstite Engineering Co., 3900 Chouteau St., St. Louis 10, Mo.
● Pritchard & Co., J. F., Equipment Div., 2200 Fidelity Bldg., Kansas City 6, Mo.
Proctor & Schwartz, Inc., 7th St. and Tabor Rd., Philadelphia 20, Pa.
Production Planning Co., 704 Woodward, Rochester, Mich.
Products Research Co., 634 S. Western Ave., Los Angeles 5, Calif.
Propellair, Inc., 1345 Lagonda Ave., Springfield, O.
Protective Coatings, Inc., P. O. Box 3985, Stratmore Station, Detroit 27, Mich.
Prox Co., Inc., Frank, 1201 S. First St., Terre Haute, Ind.
Puhl & Hepper Mfg. Co., Inc., 6400 W. Florissant Ave., St. Louis 20, Mo.
Pure Carbonic, Inc., 60 E. 42nd St., New York 17, N. Y.
● Pyle-National Co., The, 1373 W. 37th St., Chicago 9.
Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago, Ill.
Pyrolite Products Co., 1221-1231 W. 74th St., Cleveland 2, O.
Pyrometer Instrument Co., 103 LaFayette St., New York 13, N. Y.

Q

Q-P Mfg. Co., Needham Heights, Mass.
Quaker City Iron Wks., Allegheny & Tulip St., Philadelphia 34, Pa.
Quaker Rubber Corp., Comly & Milnor Sts., Philadelphia 24, Pa.

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Quickwork Div., Whiting Corp., Harvey, Ill.
Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y.
Quijada Tool Co., Inc., 5474-78 Alhambra Ave., Los Angeles 32, Calif.
Quimby Pump Div., H. K. Porter Co., Inc., Oliver Bldg., Pittsburgh 22, Pa.

R

R-S Products Corp., Germantown Ave. at Wayne Junction, Philadelphia 44, Pa.
Radiant Devices, 4030 Choteau Ave., St. Louis, Mo.
Radiator Specialty Co., 1700-1900 Dowd Rd., Charlotte 1, N. C.
Rafter Machine Co., Inc., 259 Stephens St., Belleville 9, N. J.
Raisler Corp., Grimes Sprinkler Div., 129 Amsterdam Ave., New York 23, N. Y.
Ramsey Chain Co., Inc., 1029 Broadway, Albany 1, N. Y.
Ramtite Co., The, 2563 W. 18th St., Chicago 8, Ill.
Ranco, Inc., 601 W. 5th Ave., Columbus 1, O.
● Randall Graphite Bearings, Inc., 609 W. Lake St., Chicago 6, Ill.
Ransome Machinery Co., Subsidiary of Worthington Pump & Machinery Corp., Dunellen, N. J.
Ravena Iron Co., Ravena, N. Y.
Rawlplug Co., Inc., The, 271 Church St., New York 13, N. Y.
● Ray Oil Burner Co., 401-499 Bernal Ave., San Francisco 12, Calif.
Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.
Rayfield Co., C. L., 2010-18 S. Halsted St., Chicago 8, Ill.
Raymond Pulverizer Div., Combustion Engineering Co., 1324 N. Branch St., Chicago, Ill.
● Raytheon Mfg. Co., Commercial Products Div., Waltham 54, Mass.
Reading-Pratt & Cady Div., American Chain & Cable Co., Inc., Reading, Pa.
Reading Tube Corp., Empire State Bldg., New York 1, N. Y.
Red Jacket Mfg. Co., Davenport, Ia.
Red Spot Electric Co., 7405 S. Tacoma Way, Tacoma 9, Wash.
Redmond Co., Inc., Owosso, Mich.
Reed Unit-Fans, Inc., 1001 St. Charles Ave., New Orleans 8, La.
Reeves Pulley Co., H. P., Columbus, Ind.
Reeves Steel & Mfg. Co., Dover, O.
Refinite Corp., Refinite Bldg., Omaha 8, Neb.
Refractory & Insulation Corp., 120 Wall St., New York 5, N. Y.
Refrigeration Appliances, Inc., 917-923 W. Lake St., Chicago, Ill.
Refrigeration Economics Co., Inc., 1231 Tuscarawas E., Canton 2, O.
Refrigeration Engineering Corp., 2024 Market St., Philadelphia 3, Pa.
Rega Mfg. Co., 79 Mt. Hope Ave., Rochester 7, N. Y.
Register & Grille Mfg. Co., Inc., 70 Bery St., Brooklyn, N. Y.
Reichert Float & Mfg. Co., 2238 Smead Ave., Toledo 6, O.
Reif-Rexoil, Inc., 37-41 Carroll St., Buffalo 3, N. Y.
Reilly Tar & Chemical Corp., 1615 Merchants Bank Bldg., Indianapolis 4, Ind.
Reiner & Campbell Co., Inc., 667 Norwood Terrace, Elizabeth 2, N. J.
● Reinhard Brothers Co., 11-17 S. 9th St., Minneapolis 2, Minn.
Reinties Co., Geo. P., 2517-19 Jefferson St., Kansas City, Mo.
Reliable Perforating Co., 2047 N. Wood St., Chicago, Ill.
Reliable Sheet Metal Engineering Co., 4334-50 S. Knox, Chicago, Ill.
Reliance Automatic Lighting Co., 1929 Mead St., Racine, Wis.
Reliance Electric & Engineering Co., 1058 Ivanhoe Rd., Cleveland 10, O.
Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland 3, O.
Reliance Refrigerating Machine Co., 3401 N. Kedzie Ave., Chicago, Ill.
Remco, Inc., Zelienople, Pa.
Remco Products Corp., State and Hay Sts., York, Pa.
Remington Air Conditioning Div., Remington Corp., Cortland, N. Y.
● Rempe Co., 362 N. Sacramento Blvd., Chicago 12, Ill.
Rensselaer Valve Co., Ontario St., Cohoes, N. Y.
Reps Tool Co., Inc., 94 Allyn St., Hartford 3, Conn.
Republic Flow Meters Co., 2240 Diversey Pkwy., Chicago, Ill.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Ave., Cleveland 13, O.
Republic Steel Corp., Steel & Tubes Div., 224 E. 131st St., Cleveland 8, O.
Research Corp., Chrysler Bldg. New York 17, N. Y.
Research Products Corp., 1015 E. Washington Ave., Madison 3, Wis.
Resisto Pipe & Valve Co., 262 Bridge St., East Cambridge, Mass.
Resistoflex Corp., Belleville 9, N. J.
Revcor, not Inc., 3227 W. Carroll Ave., Chicago 24, Ill.
● Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Rex Clay Products Co., 14414 Dexter Blvd., Detroit, Mich.
Rex Welder & Engineering Co., 1910 Walnut, Kansas City 8, Mo.
Reynolds Electric Co., 2603 W. Congress St., Chicago 12, Ill.
Reynolds Mfg. Co., The, 412 Prospect St., N. E., Grand Rapids, Mich.
Reynolds Mfg. Co., Inc., Springfield, Mo.
● Reynolds Metals Co., Reynolds Metals Bldg., Richmond 19, Va.
Reznor Mfg. Co., Mercer, Pa.
Rheem Mfg. Co., 570 Lexington Ave., New York 22, N. Y.
● Rhoades & Sons, J. E., 35 N. Sixth St., Philadelphia 6, Pa.
Rhode Island Fittings Co., Hillsgrove, R. I.
Rhode Island Humidifier & Ventilator Co., 99 Chauncy St., Boston 11, Mass.
Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn.
Richfield Mfg. Corp., 21 W. 19th St., New York 11, N. Y.
Richmond Engineering Co., Inc., 7th and Hospital Sts., Richmond, Va.
Richmond Fireproof Door Co., Northwest F St., Richmond, Ind.
Richmond Radiator Co., 19 E. 47th St., New York 17, N. Y.
Richmont, Inc., 2810 E. 11th St., Los Angeles 23, Calif.
● Ric-wiL Co., Union Commerce Bldg., Cleveland 14, O.
● Ridge Tool Co., Clark St., Elyria, O.
Ridgefield Chemical Products Co., Inc., 585 Broad Ave., Ridgefield, N. J.
Rid-Sludge Div., Aulwood Mfg. Co., 77 Raymond Ave., St. Paul, Minn.
Riggin Metal Products, Inc., Box 267, Kankakee, Ill.
Rigid-Tex Corp., 658 Ohio St., Buffalo 3, N. Y.
Riley Stoker Corp., 9 Neponset St., Worcester, Mass.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
● Rittling Corp., The, 1292 Niagara St., Buffalo, N. Y.
Robbins & Myers, Inc., Lagonda Ave., Springfield, O.
Roberson Co., L. N., 1539 E. 103rd St., Seattle 55, Wash.
Roberts-Gordon Appliance Corp., 137 Arthur St., Buffalo 7, N. Y.
Roberts Tube Works, 2500 Military Ave., Detroit 9, Mich.
Robertson Co., H. H., 2400 Farmers Bank Bldg., Pittsburgh 22, Pa.
Robinson Aviation, Inc., Vibrashock Div., Teterboro Air Terminal, Teterboro, N. J.
Robinson Insulation Co., Great Falls, Mont.
Rochester Lead Works, Inc., 380 Exchange St., Rochester 8, N. Y
Rochester Mfg. Co., Inc., 63 Rockwood St., Rochester 10, N. Y.
Rock Fleece Co., 115 Durango St., El Paso, Tex.
Rock Island Register Co., 2435 Fifth Ave., Rock Island, Ill.
Rockford Screw Products Co., 2501 Ninth St., Rockford, Ill.
Rockwell Co., W. S., 200 Eliot St., Fairfield, Conn.
Rockwood Mfg. Co., Inc., 1801-2001 English Ave., Indianapolis 6, Ind.
Rockwood Sprinkler Co., 38 Harlow St., Worcester 5, Mass.
Rodwell Engineering & Sales Co., 4303 Dodge St., Omaha, Neb.
Roessing Mfg. Co., 1616 Noble St., Sharpsburg, Pittsburgh 15, Pa.
Rogers Air Conditioning Div., 724 Garrison Ave., New York 59, N. Y.
Roller Bearing Co. of America, Whitehead Rd., Trenton 3, N. J.
Rolyan Metal Products, 2330 W. 58th St., Chicago 36, Ill.
Rome-Turney Radiator Co., Canal St., Rome, N. Y.
Rook Co., Leonard, 1360 Elmwood Ave., Providence, R. I.
Roots-Connersville Blower Corp., 900 W. Mount St., Connersville, Ind.
Roper Corp., Geo. D., Blackhawk Park Ave., Rockford, Ill.
Rosebraugh Co., W. W., 680 S. 17th St., Salem, Ore.
Rosedale Foundry & Machine Co., Columbus & Preble Aves., N. S., Pittsburgh, Pa.
Ross Engineering Corp., J. O., 350 Madison Ave., New York 17, N. Y.
Ross Heater & Mfg. Co., Inc., 1407 West Ave., Buffalo 13, N. Y.
Ross Sprinkler Co., 34 Roberts St., Pasadena 3, Calif.
Ross Valve Mfg. Co., Inc., 6 Oakwood Ave., Troy, N. Y.
Rotary Concrete Drill Co., 650 S. Arroyo Pkwy., Pasadena 2, Calif.
Rotary Mfg. Co., 5718 Long Beach Ave., Los Angeles, Calif.
Rotary Seal Co., 2020 N. Larrabee St., Chicago 14, Ill.
Rotor Corp., Miamisburg, O.
Roy Co., Milton, 1371 E. Mermaid Ave., Philadelphia 18, Pa.
Royal Heaters, Inc., 1024 Westminster Ave., Alhambra, Calif.
Royal Mfg. Corp., Waterloo, Ind.
Royal Ventilator Co., 415 Locust St., Philadelphia 6, Pa.
Royersford Foundry & Machine Co., Inc., 102-132 Main St., Royersford, Pa.
Roylyn, Inc., 716-718 W. Wilson Ave., Glendale 3, Calif.
Ruberoid Co., 500 Fifth Ave., New York, N. Y.
Ruby Chemical Co., 74 McDowell St., Columbus 8, O.
Ruehfel Co., Inc., George, 101 Menahan St., Brooklyn, N. Y.
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee 12, Wis.
Ruggles-Klingemann Mfg. Co., 4 Foster Ct., P. O. Box 550, Salem, Mass.
● Ruppright, Siegfried, Box 6795, Los Angeles 22, Calif.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Russell Co., F. C., The, 6400 Herman Ave., Cleveland 2, O.
● Russell Electric Co., 348 W. Huron St., Chicago 10, Ill.
Russell Mfg. Co., John M., Box 246, Naugatuck, Conn.
Ruthmann Machinery Co., 1810 Reading Rd., Cincinnati, O.
Rutland Fire Clay Co., Curtis Ave., Rutland, Va.
Ruud Mfg. Co., 2934 Smallman St., Pittsburgh 1, Pa.

S

SKF Industries, Inc., Front St. & Erie Ave., Philadelphia 32, Pa.
Sac Tool Mfg. Co., 1913 Washington Ave., St. Louis 3, Mo.
St. Clair Rubber Co., 440 E. Jefferson, Detroit, Mich.
St. Louis Tool Co., 6100 Prescott St., St. Louis 15, Mo.
St. Paul Corrugating Co., S. Wabasha and Water Sts., St. Paul 1, Minn.
Sales & Co., Murray W., 801 W. Baltimore Ave., Detroit 2, Mich.
Salina Metal Products Co., 9th and Bishop, Salina, Kan.
Sall Bros. Co., 2320 Kishwaukee St., Rockford, Ill.
Sall Mountain Co., 176 W. Adams St., Chicago 3, Ill.
Salsbury Motors, Inc., 1201 E. Lexington St., Pomona, Calif.
Sampsel Time Control, Inc., Spring Valley, Ill.
Sandberg Sheet Metal Works, 500 N. E. Union Ave., Portland, Ore.
Sandee Mfg. Co., 5050 W. Foster Ave., Chicago, Ill.
Sangamo Electric Co., 1301 N. 11th St., Springfield, Ill.
● Sarco Co., Inc., Empire State Bldg., New York 1, N. Y.
Sarcotherm Controls, Inc., Empire State Bldg., New York 1, N. Y.
Sauereisen Cements Co., Sharpsburg Station, Pittsburgh 15, Pa.
Saunders Machine & Tool Corp., 25 Atherton St., Yonkers, N. Y.
Saverite Engineering Co., 1030 Willow Ave., Hoboken, N. J.
Sawyer Electrical Mfg. Co., 5701 Smithway, Los Angeles, Calif.
Sawyer Heating Co., 5736 12th St., Detroit, Mich.
Scaife Co., 26 Ann St., Oakmont, Pa.
Scanlan-Morris Co., Madison 4, Wis.

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Schade Valve Mfg. Co., 2527 N. Bodine St., Philadelphia 33, Pa.
Schaible Co., The, 1086 Summer St., Cincinnati 4, O.
Schatz Mfg. Co., The, Fairview, Poughkeepsie, N. Y.
● Schaub Engineering Co., Inc., Fred H., 2110 S. Marshall Blvd., Chicago 23, Ill.
Schecter Brothers Co., Hancock and Huntingdon Sts., Philadelphia 33, Pa.
Schieren Co., Chas. A., 30-38 Ferry St., New York 7, N. Y.
Schild Mfg. Co., 739 Broadway, Milwaukee, Wis.
Schmeig Industries, 312-320 Piquette Ave., Detroit 2, Mich.
● Schnacke, Inc., 1016 E. Columbia St., Evansville, Ind.
Schneible Co., Claude B., 2827 25th St., Detroit 16, Mich.
Schoedinger, F. O., 322-358 Mt. Vernon Ave., Columbus 16, O.
Schramm, Inc., West Chester, Pa.
Schundler & Co., Inc., F. E., 45-15 Vernon Blvd., Long Island City, N. Y.
Schutte & Koerting Co., 12th and Thompson Sts., Philadelphia, Pa.
Schwitzer-Cummins Co., 1145 E. 22nd St., Indianapolis 7, Ind.
Sciaky Bros., Inc., 4915 W. 67th St., Chicago 38, Ill.
Scientiae Tool Co., 101 Pine, Dayton, O.
Scientific Instrument Co., 307 W. Congress St., Detroit 26, Mich.
Scott-Newcomb, Inc., 1922 Pine St., St. Louis, Mo.
Scott Valve Mfg. Co., 3963 McKinley Ave., Detroit 8, Mich.
Scully Signal Co., 88 First St., Cambridge 41, Mass.
Sealed Power Corp., 500 Sanford St., Muskegon 61, Mich.
Sealkote Corp., 400 N. Sangamon St., Chicago, Ill.
Sealol Corp., 45 Willard Ave., Providence 5, R. I.
Seamlex Co., Inc., 41-23 24th St., Long Island City 1, N. Y.
Selas Corp. of America, Erie Ave. and D St., Philadelphia 34, Pa.
Sellers Engineering Co., 4860 N. Clark St., Chicago 40, Ill.
Semco Mfg. Co., 118-122 Third Ave., N., Nashville, Tenn.
Semet-Solvay Engineering Corp., 40 Rector St., New York 6, N. Y.
Semler Co., Jeannette, Pa.
Semon Bache & Co., Greenwich & Morton Sts., New York 14, N. Y.
Sensenich Corp., Adjacent to Lancaster Municipal Airport, Lancaster, Pa.
Servel, Inc., Electric Refrigeration Div., 119 Morton Ave., Evansville 20, Ind.
Service To Industry, Box 133, West Hartford, Conn.
● Shafco Distributing Corp., 1354 Book Bldg., Detroit 26, Mich.
Shafer Bearing Corp., 1412 W. Washington, Chicago 7, Ill.
Shakeproof, Inc., 2501 N. Keeler Ave., Chicago 39, Ill.
Shallcross Co., 48th and Grays Ferry Rd., Philadelphia 43, Pa.
Shallcross Controls, Inc., 2217-21 N. 31st St., Milwaukee 8, Wis.
Shank Co., Cyrus, 625 W. Jackson Blvd., Chicago 6, Ill.
Sharon Steel Corp., Sharon, Pa.
Shaw Co., Benjamin F., Second & Lombard Sts., Wilmington 99, Del.
Shaw-Kendall Engineering Co., 120-130 S. Superior St., Toledo 4, O.
Shaw-Perkins Mfg. Co., 201 E. Carson St., Pittsburgh 22, Pa.
Sheet Metal Mfg. Co., Inc., 953 Myrtle Ave., Brooklyn 6, N. Y.
Sheetlock Co., 4521 N. Clark St., Chicago, Ill.
Sheffler-Gross Co., Drexel Bldg., Philadelphia 6, Pa.
Sherwin-Williams Co., The, 101 Prospect Ave., N. W., Cleveland, O.
Shreveport Engineering Co., Inc., 1553-55 Texas Ave., Shreveport, La.
Sight Feed Generator Co., 14-18 N. 10th St., Richmond, Ind.
Signal Electric Mfg. Co., Menominee, Mich.
Signal Indicator Co., 894 Broadway, New York 3, N. Y.
Silvercote Products, Inc., 161 E. Erie St., Chicago, 11, Ill.
Simplex Heating Specialty Co., Inc., 954 Cabell St., Lynchburg, Va.
Simplex Mfg. Co., 198 N. Main St., Fond du Lac, Wis.
Simplex Oil Heating Corp., 11 Park Pl., New York 7, N. Y.
Sims Co., 18th & Whitley Sts., Erie, Pa.
Sinker-Davis Co., 230 S. Missouri St., Indianapolis 4, Ind.
Sioux Steel Co., P. O. Box 898, Sioux Falls, S. D.
Sipe & Co., James B., Box 8010, Pittsburgh 16, Pa.
Skaneateles Mfg. Co., Inc., 122 Dickerson St., Syracuse 2, N. Y.
● Skidmore Corp., St. Joseph, Mich.
Skilbeck Mfg. Co., 7432 27th Ave., Kenosha, Wis.
Skilsaw, Inc., 5033 Elston Ave., Chicago 30, Ill.
Skinner Co., M. B., South Bend, Ind.
Skinner Engine Co., 337 W. 12th St., Erie, Pa.
● Skinner Heating & Ventilating Co., Inc., Div. of St. Louis Blow Pipe & Heater Co., Inc., 1948 N. 9th St., St. Louis 6, Mo.
Skinner Irrigation Co., 1211 E. Canal St., Troy, O.
Skuttle Mfg. Co., 4099 Beaufait, Detroit 7, Mich.
Sly Mfg. Co., W. W., 4700 Train Ave., Cleveland 2, O.
Small Motors, Inc., 2076 Elston Ave., Chicago 14, Ill.
● Smith Co., Inc., H. B., The, 57 Main St., Westfield, Mass.
Smith Co., J. B., 3327 B St., Philadelphia 34, Pa.
Smith Corp., A. O., 3533 N. 27th St., Milwaukee 1, Wis.
Smith Heater Co., Peter, 10501 Haggerty, Dearborn, Mich.
Smith, Inc., James Campbell, Station St., Mentor, O.
Smith, Inc., Winfield, H., 144 Eaton St., Springfield, Erie County, N. Y.
Smith & Kanzler Corp., E. Linden Ave., Linden, N. J.
Smith Mfg. Co., Inc., F. A., P. O. Box 509, Rochester 2, N. Y.
Smith-Raymond Co., 1231-33 Tenth Ave., Columbus, Ga.
Smith Twin Tubular Boiler Co., Inc., Cottman St., at State Rd., Philadelphia 35, Pa.
Smith Welding Equipment Corp., 2633 S. E. Fourth St., Minneapolis 14, Minn.
Smolensky Valve Co., Inc., 940 Broadway, Bedford, O.
Smooth-On Mfg. Co., 568-574 Communipaw Ave., Jersey City 4, N. J.
Snap-On Tools Corp., Kenosha, Wis.
Snyder Sales Corp., 5225 Wilshire Blvd., Los Angeles 36, Calif.
Socony Vacuum Oil Co., Inc., 42 Broadway, New York 4, N. Y.
Sola Electric Co., 4633 W. 16th St., Chicago, Ill.
Solvay Sales Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Somers, Inc., H. J., 6063 Wabash Ave., Detroit 8, Mich.
Somerville Iron Wks., Somerville, N. J.
Sonneborn Sons, Inc., L., 88 Lexington Ave., New York 16, N. Y.
Sonner Burner Co., 412-420 E. 6th Ave., Winfield, Kans.
Soreng Mfg. Co., 1903 N. Clybourn Ave., Chicago, Ill.
● South Bend Air Products, Inc., 304 E. Colfax Ave., South Bend 22, Ind.
South Chester Tube Co., Front & Thurlow Sts., P. O. Box 60, Chester, Pa.
Southbridge Roofing Co., Inc., Hartwell and Chapin St., Southbridge, Mass.
Souther Iron Co., E. E., 1952 Kienlen Ave., St. Louis 20, Mo.
Southern States Iron Roofing Co., Stiles Ave. & Louisville Rd., Savannah, Ga.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
● Spang-Chalfant, Div. of National Supply Co., Grant Bldg., Pittsburgh 30, Pa.
Spartan Tool Co., 6007 N. Lincoln Ave., Chicago, Ill.
Special Chemicals Corp., 30 Irving Pl., New York 3, N. Y.
Specialty Converters, Inc., East Braintree, Mass.
Speedway Mfg. Co., 1834 S. 52nd Ave., Chicago (Cicero), Ill.
Spence Engineering Co., Inc., 32 Grant St., Walden 6, N. Y.
● Spencer Heater Div., Avco Mfg. Corp., 164 Park St., Williamsport 19, Pa.
Spencer Thermostat Co., 34 Forest St., Attleboro, Mass.
Spencer Turbine Co., 486 New Park Ave., Hartford 6, Conn.
Sponge Rubber Products Co., Shelton, Conn.
● Sporlan Valve Co., Sporlan Bldg., 7525 Sussex Ave., St. Louis 17, Mo.
Spray Engineering Co., 114 Central St., Somerville 45, Mass.
● Spraying Systems Co., 4031 W. Lake St., Chicago 24, Ill.
Sprayo-Flake Co., 2715 Irving Park Blvd., Chicago 18, Ill.
Springfield Boiler Co., 1939 E. Capitol Ave., Springfield, Ill.
Sprout-Waldron & Co., Muncy, Pa.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Square D Co., Industrial Controller Div., 4041 N. Richards St., Milwaukee 12, Wis.
Squires Co., C. E., The, E. 40th St., & Kelley Ave., Cleveland 3, O.
Standard Asbestos Mfg. Co., 820-822 W. Lake St., Chicago 7, Ill.
Standard Electric Mfg. Co., West Berlin, N. J.
Standard Engineering Wks., 289 Roosevelt Ave., Pawtucket, R. I.
Standard Fuel Engineering Co., 667 Post Ave., S. Detroit 17, Mich.
Standard Furnace & Supply Co., 413-17 S. Tenth St., Omaha 8, Neb.
Standard Heater & Oil Equipment Co., 245 Cornelison Ave., Jersey City 2, N. J.
Standard Lime & Stone Co., 2004 First National Bank Bldg., Baltimore, Md.
Standard Machine & Mfg. Co., 8213-15 Gravois Ave., St. Louis 23, Mo.
Standard Motor Corp., Elyria, O.
Standard Pressed Steel Co., Jenkintown, Pa.
Standard Reseater Corp., 423 W. 126th St., New York 27, N. Y.
Standard Rolling Mills, Inc., 193 Newell St., Brooklyn 22, N. Y.
● Standard Stamping & Perforating Co., 3151 W. 49th Pl., Chicago 32, Ill.
Standard Thermometer, Inc., 952 Dorchester Ave., Boston 25, Mass.
Standard Transmission Equipment Co., 3407 Verdugo Rd., Los Angeles 41, Calif.
Standard Tube Co., 14600 Woodward Ave., Highland Park 3, Mich.
Standard Ventilator Co., Lewisburg, Pa.
Stanley Electric Tools, Div. of The Stanley Works, Myrtle St., New Britain, Conn.
Stanley Works, The, 195 Lake St., New Britain, Conn.
Staples & Pfeiffer, 538 Bryant St., San Francisco 7, Calif.
Star Electric Motor Co., 200 Bloomfield Ave., Bloomfield, N. J.
Star Expansion Bolt Co., 147 Cedar St., New York 6, N. Y.
Star Mfg. Co., Inc., 530 Kinsley Ave., Providence, R. I.
Star Products Co., 130 Walnut Ave., New York 54, N. Y.
Starr Piano Co., Richmond, Ind.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
Steamaire Co., Cincinnati 2, O.
Steel City Electric Co., 1201 Columbus Ave., Pittsburgh, Pa.
Steel Improvement & Forge Co., 974 E. 64th St., Cleveland 14, O.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
Steinhorst & Sons, Inc., Emil, 612 South St., Utica 3, N. Y.
● Stephens-Adamson Mfg. Co., 47 Ridgeway Ave., Aurora, Ill.
Sterling Electric Motors, Inc., 5401 Anaheim Telegraph Rd., Los Angeles 22, Calif.
Sterling Engineering & Mfg. Corp., 114 Business St., Hyde Park 36, Mass.
● Sterling, Inc., 3738 N. Holton St., Milwaukee 12, Wis.
Stevens Mfg. Co., Inc., Mansfield, O.
Stewart Ice Machine Co., 1282 W. 1st St., Pomona, Calif.
Stewart Mfg. Co., Inc., 610 Bloomfield Ave., Bloomfield, N. J.
Stewart-Rogers, Inc., 3915 Powelton Ave., Philadelphia 4, Pa.
Stewart-Warner Corp., 1826-1852 Diversey Parkway, Chicago 14, Ill.
● Stic-Klip Mfg. Co., 50 Regent St., Cambridge 40, Mass.
Stickle Steam Specialties Co., 2215 Valley Ave., Indianapolis 1, Ind.
Stockham Pipe Fittings Co., 4100 Tenth Ave., N. Birmingham 2, Ala.
Stokes Machine Co., F. J., 5910 Tabor Rd., Philadelphia 20, Pa.
Stokes Molded Products, Taylor & Webster, Trenton 4, N. J.
Stokol-Stoker Co., Inc., 2060 Northwestern Ave., Indianapolis 7, Ind.
Stout & Sons, David, 7016 Manchester Blvd., St. Louis 17, Mo.
Stow Mfg. Co., 445 State St., Binghamton, N. Y.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, 218 S. Geddes St., Syracuse 4, N. Y.
Strandwitz & Co., Inc., W. J., Jefferson and Master Sts., Camden, N. J.
● Strong, Carlisle & Hammond Company, 1392 W. Third St., Cleveland 13, O.
Struthers Dunn, Inc., 1321 Arch St., Philadelphia, Pa.
Struthers Wells Corp., Titusville, Pa.
Stuart Co., W. W., 417 Ninth St., Des Moines 9, Iowa.
Sturtevant Co., P. A., Addison, Ill.

● Advertisement in this issue. See Index to Advertisers, page 416.

Sudbury Laboratory, South Sudbury, Mass.
Sulflo, Inc., 1143 E. Jersey St., Elizabeth 4, N. J.
Sullivan Valve & Engineering Co., 910 S. Arizona St., Butte, Mont.
Sundstrand Machine Tool Co., Hydraulic Div., 2531 11th St., Rockford, Ill.
Sun-Fire Stoker Corp., New Albany, Ind.
Super Mold Corp., 402 N. Sacramento St., Lodi, Calif.
Super Radiator Corp., 652 Stinson Blvd., Minneapolis 13, Minn.
Superior Combustion Industries, Inc., Emmaus, Pa.
Superior Railway Products Corp., 7501 Thomas Blvd., Pittsburgh, Pa.
Superior Sheet Steel Co., The, Div. of Borg-Warner Corp., Canton-Louisville Rd., Canton, O.
Superior Steel Corp., Grant Bldg., Pittsburgh 19, Pa.
Superior Valve and Fittings Co., 1509 W. Liberty Ave., Pittsburgh 26, Pa.
Supreme Air Filter Co., 126 W. 21st St., New York, N. Y.
Supreme Electric Products Corp., 194 Vassar St., Rochester 7, N. Y.
● Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Sutton Corp., O. A., Beacon Bldg., Wichita 2, Kan.
Swaby Mfg. Co., 2330 W. Cermak Rd., Chicago 8, Ill.
Swaine Mfg. Co., Fred J., 1300 N. Seventh St., St. Louis 6, Mo.
● Swartwout Co., 18511 Euclid Ave., Cleveland 12, O.
Swendeman, Inc., 171 Camden St., Boston, Mass.
Swift Lubricator Co., 19 James Bldg., Elmira, N. Y.
Swift Mfg. Co., Inc., 247 McDougall Ave., Detroit 7, Mich.
Syncromatic Corp., Watertown, Wis.
Synchro-Start Products, Inc., 221 E. Cullerton St., Chicago 16, Ill.
Syntron Co., Homer City, Pa.

T

Taber Pump Co., 272 Elm St., Buffalo 3. N. Y.
● Taco Heaters, Inc., 342 Madison Ave., New York 17, N. Y.
Tagliabue Div., C. J., Portable Products Corp., Park & Nostrand Ave., Brooklyn 5, N. Y.
● Tal Bender, Inc., 417 N. Water St., Milwaukee 2, Wis.
Tallmadge & Co., Webster, 364 Glenwood Ave., East Orange, N. J.
Tamms Silica Co., 228 N. LaSalle St., Chicago 1, Ill.
● Taylor Forge & Pipe Wks., P. O. Box 485, Chicago 90, Ill.
Taylor-Hall Welding Corp., 212 Dana Ave., N. E., Warren, O.
Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.
Taylor Sons Co., Charles, 715 Burns St., Cincinnati 14, O.
Taylor-Winfield Corp., 1052 Mahoning Ave., N. W., Warren, O.
Technical Ply-Woods, 228 N. LaSalle St., Chicago 1, Ill.
Techtmann Industries, Inc., 714 W. Wisconsin Ave., Milwaukee 1, Wis.
Tecumseh Products Co., Tecumseh, Mich.
Telechron, Inc., Ashland, Mass.
Telsit Insulation Co., 1933 West Farms Rd., Bronx 60, N. Y.
Templeton Bros., 169 Reservation Rd., Hyde Park 36, Mass.
Templeton Mfg. Co., 114 Business St., Hyde Park 36, Mass.
Tempo Products Co., 1900 Euclid Ave., Cleveland 15, O.
Temprite Products Corp., 47 Piquette Ave., Detroit 2, Mich.
● Tennessee Coal, Iron & Railroad Co., United States Steel Corp. Subsidiary, Brown-Marx Bldg., Birmingham 2, Ala.
Tennessee Products and Chemical Corp., American National Bank Bldg., Nashville, Tenn.
Tenney Engineering, Inc., 26 Avenue B, Newark 5, N. J.
Terra-Temp Co., Inc., Circle Bldg., Indianapolis 4, Ind.
Terre Haute Boiler Works Co., 1140 Crawford, Terre Haute, Ind.
Terry Steam Turbine Co., The, P. O. Box 1200, Hartford 1, Conn.
Textite Corp., 2110 Roscoe St., Chicago 18, Ill.
Thermac Co., 800 E. 108th St., Los Angeles, Calif.
Thermal Co., Inc., 1434 N. Fourth St., Milwaukee, Wis.
Thermal Engineering Co., 2967 S. LaSalle St., Chicago 16, Ill.
Thermal Industries, Box No. 725, Indio, Calif.
Thermix Corp., The, First National Bank Bldg., Greenwich, Conn.
Thermoid Co., Whitehead Rd., Trenton 6, N. J.
Thomas Co., Arthur H., W. Washington Square, Philadelphia, Pa.
Thompson & Co., 1085 Allegheny Ave., Oakmont, Pa.
Thompson & Son Co., The Henry G., 277 Chapel St., New Haven, Conn.
Thomson Electric Welder Co., 161 Pleasant St., Lynn, Mass.
Thomson Industries, Inc., Manhasset, N. Y.
Threadwell Tap & Die Co., Greenfield, Mass.
● Thrush & Co., H. A., Peru, Ind.
Thwing-Albert Instrument Co., Penn and Pulaski Ave., Philadelphia 44, Pa.
Tierney Rotor Ventilator Co., 239 Fourth Ave., S., Minneapolis, Minn.
Tiffin Eaves Trough Clamp Co., 25 Miami, Tiffin, O.
Timken Roller Bearing Co., 1835 Dueber Ave., S. W., Canton 6, O.
Tinnerman Products, Inc., 2018 Fulton Rd., Cleveland 13, O.
Tippett & Wood, Morris and Warren Sts., Phillipsburg, N. J.
Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.
● Titus Mfg. Corp., 113 E. 8th St., Waterloo, Iowa
● Titusville Iron Wks. Co., The, Titusville, Pa.
Todd Shipyards Corp., Combustion Equipment Div., 81-16-45th Ave., Elmhurst, L. I., N. Y.
Toledo Pipe Threading Machine Co., 1445 Summit St., Toledo 4, O.
Torit Mfg. Co., 292 Walnut St., St. Paul 2, Minn.
Tork Clock Co., Inc., 1 Grove St., Mt. Vernon, N. Y.
Torrington Mfg. Co., 70 Franklin St., Torrington, Conn.
Trade-Wind Motorfans, Inc., 5725 S. Main St., Los Angeles 37, Calif.
Trageser Copper Wks., Inc., 5000 Grand Ave., Maspeth, Long Island, N. Y.
● Trane Co., The, La Crosse, Wis.
Trent, Inc., Leverington Ave. and Wilde St., Philadelphia 27, Pa.
Trent Tube Mfg. Co., East Troy, Wis.
Trerice Co., H. O., 1420 W. Lafayette Blvd., Detroit 16, Mich.
Triangle Mfg. Co., 396 Division St., Oshkosh, Wis.
Tri-Clover Machine Co., 2809 60th St., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., 55-71 Amory St., Roxbury, Boston 19, Mass.
Trimount Instrument Co., 37 W. Van Buren St., Chicago 5, Ill.
Trimount Rotary Power Co., 189 Cedar St., P. O. Box 65, East Dedham, Mass.
Trindl Products, Ltd., 17 E. 23rd St., Chicago 16, Ill.
Trion, Inc., McKees Rocks, Pa.
Triplex Heating Specialty Co., Inc., 252 N. Grant, Peru, Ind.
Trombetta Solenoid Co., 329 N. Milwaukee St., Milwaukee 2, Wis.
Tropical Paint & Oil Co., 1244-82 W. 70th St., Cleveland 2, O.
Troy Engine & Machine Co., 5 Railroad Ave., Troy, Pa.
Truflo Fan Co., 523 Main St., Harmony, Pa.
Tru-Line Corp., 1725 Clover Field Blvd., Santa Monica, Calif.
Trumbull Electric Mfg. Co., The, Woodford Ave., Plainville, Conn.
Truscon Laboratories, Caniff and Grand Trunk R. R., Detroit 11, Mich.
Truscon Steel Co., 1315 Albert St., Youngstown 1, O.
Tryco Products, Inc., Railroad Sq., Westfield, Mass.
● Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
Tubing Appliance Co., 7112 Victoria Ave., Los Angeles 43, Calif.
Tubing Seal-Cap, Inc., 2810 E. 11th St., Los Angeles 23, Calif.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.
Turnbull Mfg. & Dist. Co., 9930 Freeland Ave., Detroit 27, Mich.
Turner Brass Wks., The, 821-47 Park Ave., Sycamore, Ill.
Tuthill Pump Co., 939 E. 95th St., Chicago 19, Ill.
● Tuttle & Bailey, Inc., Corbin Ave., New Britain, Conn.
Tweco Products Co., Wichita, Kan.
XXth Century Heating & Ventilating Co., 96 Ira Ave., Akron 1, O.
Typhoon Air Conditioning Co., Inc., Div. of Ice Air Conditioning Co., Inc., 794 Union St., Brooklyn 15, N. Y.

U

U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54, Calif.
U. S. Electrical Tool Co., 1050 Findlay St., Cincinnati 14, O.
U. S. Expansion Bolt Co., P. O. Box 827, State St. & P. R. R., York, Pa.
U. S. Gutta Percha Paint Co., 43 Dudley St., Providence 1, R. I.
U. S. Machine Corp., Lebanon, Ind.
U. S. Pipe & Mfg. Co., 249 First St., San Francisco 5, Calif.
USHCO Mfg. Co., Inc., 135 Tonawanda St., Buffalo 7, N. Y.
Uehling Instrument Co., 473 Getty Ave., Paterson 3, N. J.
Una Welding, Inc., 1615 Collamer Ave., E. Cleveland 10, O.
Underground Steam Construction Co., 73 Pitts St., Boston 14, Mass.
Unified Air Conditioner Co., Torry Bldg., Duluth, Minn.
Uniflow Mfg. Co., E. Lake Rd., Erie, Pa.
Union Asbestos & Rubber Co., 54th Ave. and 18th St., Cicero 50, Ill.
Union Carbide & Carbon Corp., 30 E. 42nd St., New York, N. Y.
Union Iron Wks., 1500 Cascade St., Erie, Pa.
Union Metal Wks., 128 Carter St., Chelsea 50, Mass.
Union Steam Pump Co., Capitol Ave., S. W., Battle Creek, Mich.
Union Water Meter Co., 333 Hermon St., Worcester, Mass.
United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y.
United Cinephone Corp., Torrington, Conn.
United Cork Companies, Central Ave., Kearny, N. J.
United Electric Controls Co., 69-71 A St., Boston 27, Mass.
United Metal Hose Co., Inc., 36-01 43rd Ave., Long Island City 1, N. Y.
● United States Air Conditioning Corp., 33rd & Como Ave., S. E., Minneapolis 14, Minn.
United States Gasket Co., 1518 Pierce Ave., Camden, N. J.
United States Gauge Div. of American Machine & Metals, Inc., Sellersville, Pa.
United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.
United States Mineral Wool Co., South Milwaukee, Wis.
United States Ozone Co. of America, Crescent St., Scottdale, Pa.
United States Pipe & Foundry Co., Burlington, N. J.
● United States Radiator Corp., 300 Buhl Bldg., Detroit 31, Mich.
United States Register Co., Burnham St., Battle Creek, Mich.
United States Rubber Co., 1230 Sixth Ave., New York 20, N. Y.
● United States Steel Corp., 436 Seventh Ave., Pittsburgh, Pa.
● United States Steel Export Co., New York, N. Y.
● United States Steel Supply Co., 1319 W. Wabansia, Chicago, Ill.
United States Stoneware Co., 60 E. 42nd St., New York 17, N. Y.
Universal Air Filter Corp., 332 W. Michigan St., Duluth 2, Minn.
Universal Cooler, Div. of International Detrola Corp., 299 Joseph St., Marion, O.
Universal-Cyclops Steel Corp., Bridgeville, Pa.
Universal Gypsum & Lime Co., 111 W. Washington St., Chicago, Ill.
Universal Power Corp., 731 Carnegie Ave., Cleveland 15, O.
Universal Welder Corp., 731 Carnegie Ave., Cleveland 15, O.
Universal Zonolite Insulation Co., 135 S. LaSalle St., Chicago 3, Ill.
Uno Ventilator Co., 565 Lincoln Ave., Cliftondale, Mass.
Utica Products, Inc., Utica 4, N. Y.
Utica Radiator Corp., 2201 Dwyer Ave., Utica 2, N. Y.
● Utility Appliance Corp., 4851 S. Alameda St., Los Angeles 11, Calif.
Utility Laboratory, Inc., 330 36th St., Brooklyn 32, N. Y.

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V

V-Belt Clutch Co., 3757 Wilshire Blvd., Los Angeles 5, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vanderman Mfg. Co., Mansfield Ave., Willimantic, Conn.
Van Dorn Electric Tool Co., Towson, Md.
Van Noorden Co., E., 100 Magazine St., Boston 19, Mass.
Vapofier Corp., 10316 S. Throop St., Chicago 43, Ill.
Vapor Car Heating Co., Inc., 80 E. Jackson Blvd., Chicago 4, Ill.
Vapor Specialty Co., 101 W. 42nd St., New York 18, N. Y.
Ventilating Products Co., 2800 Cottage Grove Ave., Chicago, Ill.
Verson Allsteel Press Co., 93rd & Kenwood Ave., Chicago 19, Ill.
Vesco Corp., 1381 Sedgwick Ave., New York 52, N. Y.
Vibration Eliminator Co., 10-28 47th Ave., Long Island City 1, N. Y.
Victaulic Co. of America, 30 Rockefeller Plaza, New York 20, N. Y.
Victor Electric Products, Inc., 2950 Robertson Rd., Cincinnati 9, O.
Victor Equipment Co., 844 Folsom St., San Francisco 7, Calif.
Viking Air Conditioning Corp., 5600 Walworth Ave., Cleveland 2, O.
Viking Mfg. Corp., 1747 Chester Ave., Cleveland 14, O.
Viking Pump Co., Fourth and Rouse Sts., Cedar Falls 1, Ia.
Viking Shear Co., 1063 W. 19th St., Erie, Pa.
Vilter Mfg. Co., 2148 S. First St., Milwaukee 7, Wis.
Vinco Co., Inc., The, 305 E. 45th St., New York 17, N. Y.
Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Virginia Smelting Co., West Norfolk, Va.
Vogt Machine Co., Henry, 1000 W. Ormsby St., Louisville 10, Ky.
Voss Co., J. H. H., 785 E. 144th St., Corner of Wales Ave., New York 54, N. Y.
Vulcan Electric Co., 88-90 Holten St., Danvers, Mass.
● Vulcan Radiator Co., 26 Francis Ave., Hartford 6, Conn.

W

W-H Engineering Co., 4102 S. LaSalle St., Chicago 9, Ill.
Wabash Mfg. Co., 2700 S. Michigan Ave., Chicago 16, Ill.
Wade Mfg. Co., Elgin, Ill.
Wagner Awning & Mfg. Co., 2658 Scranton Rd., Cleveland, O.
● Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 14, Mo.
Waldron Corp., John, New Brunswick, N. J.
Walker Jamar Co., 367 S. First Ave., E., Duluth, Minn.
Wall Chemicals Div. of The Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23, Ill.
Wallace Supplies Mfg. Co., 1304 Diversey Pkwy., Chicago 14, Ill.
Wallace & Tiernan Co., Inc., P. O. Box 178, Newark 1, N. J.
Walsh-Holyoke Steam Boiler Co., Holyoke, Mass.
Walsh Refractories Corp., 4070 N. First St., St. Louis 7, Mo.
Walsh-Spencer Co., 420 Boylston St., Boston 16, Mass.
Walton Co., 94 Allyn St., Hartford 3, Conn.
● Walworth Co., 60 E. 42nd St., New York 17, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Ward Leonard Electric Co., 37 South St., Mt. Vernon, N. Y.
Warlo Corp., 330 W. 42nd St., New York 18, N. Y.
Warner Bros. Co., Spiratube Div., Bridgeport 1, Conn.
Warner Ventilator Co., La Grange, Ind.
Warren Electric Appliance Co., Warren Bank & Trust Co. Bldg., Warren, Pa.
Warren Foundry & Pipe Corp., 11 Broadway, New York 4, N. Y.
Warren Steam Pump Co., Inc., 300 Bridges Ave., Warren, Mass.
● Warren Webster & Co., 17th and Federal Sts., Camden, N. J.
Washburne & Co., E. G., 207 Fulton St., New York, N. Y.
Washington Steel Corp., Griffith Ave., Washington, Pa.
Water Cooling Corp., 71 Nassau St., New York 7, N. Y.
Water Cooling Equipment Corp., New Hampshire Ave. & Weber Rd., Affton Station, St. Louis 23, Mo.
Water Cooling Tower Co., 5501 Cornell Ave., Chicago, Ill.
Water Refining Co., 1123 Barthold, Ft. Wayne, Ind.
Water Service Laboratories, Inc., 423 W. 126th St., New York 27, N. Y.
Water Treatment Company of America, 1159 Hodgkiss St., Pittsburgh 12, Pa.
Waterfilm Boilers, Inc., 154 Ogden Ave., Jersey City 7, N. J.
Watson & McDaniel Co., 440 N. Marshall, Philadelphia 23, Pa.
Watson-Standard Co., 225 Galveston Ave., Pittsburgh 30, Pa.
● Watson-Stillman Co., 140 Aldene Rd., Roselle, N. J.
Wattenamel Co., 7400 Archer Ave., Summit, Ill.
Watts Regulator Co., 10 Embankment St., Lawrence, Mass.
Waukesha Motor Co., Waukesha, Wis.
Waverly Heating Supply Co., 31 Union St., Boston 8, Mass.
Wayne Davies & Co., Westboro, Mass.
Weatherhead Co., 300 E. 131st St., Cleveland 8, O.
Weaver Mfg. Co., Springfield, Ill.
Webb Co., The, Webb City, Mo.
Webb Machine & Tool Co., Imperial, Pa.
● Webster & Co., Warren, 17th & Federal Sts., Camden, N. J.
Webster Electric Co., S. W. Corner Clark & De Koven Aves., Racine, Wis.
● Webster Engineering Co., 419 W. Second St., Tulsa 1, Okla.
Webster Tallmadge & Co., 364 Glenwood Ave., East Orange, N. J.
Wedge Protectors, Inc., 9522 Richmond Ave., Cleveland 5, O.
Weil-McLain Co., Michigan City, Ind.
● Weil Pump Co., 1528 N. Fremont St., Chicago 22, Ill.
● Weinman Pump Mfg. Co., The, 290 W. Spruce St., Columbus 8, O.
● Weirton Steel Co., Weirton, W. Va.
Weiss & Co., H., 113-115 Mercer St., New York, N. Y.
Weksler Thermometer Corp., 52-56 W. Houston St., New York 12, N. Y.
Weldex, Inc., 7326 McDonald Ave., Detroit, Mich.
Welding Apparatus Co., 2750 W. Van Buren St., Chicago, Ill.
Welding Service Co., 1309 E. Waterman, Wichita, Kan.
Welsbach Corp., The, Kitson Div., 1500 Walnut St., Philadelphia, Pa.
Welsbach Corp., The, Ozone Processes Div., 1500 Walnut St., Philadelphia, Pa.
West Coast Electrical Mfg. Co., 10010 S. Main St., Los Angeles 3, Calif.
Western Blower Co., 1800 Airport Way, Seattle 4, Wash.
Western Brass Mills Div. of Olin Industries, Inc., East Alton, Ill.
Western Chemical Co., 713 Washington St., Kansas City 6, Mo.
Western Engineering & Mfg. Co., 1726 E. Washington Blvd., Los Angeles 21, Calif.
Western Felt Works, 4029-4117 Ogden Ave., Chicago 23, Ill.
Western Hanger Co., 55 New Montgomery St., San Francisco, Calif.
Western Lithograph Co., 600 E. 2nd St., Los Angeles, Calif.
Western Mineral Products Co., 2602 Ed Creighton Ave., Omaha 1, Nebr.
Western Piping & Engineering Co., 119 Kansas St., San Francisco 3, Calif.
Western Precipitation Corp., 1016 W. 9th St., Los Angeles, Calif.
Western Thermal Equipment Co., 1701 W. Slauson Ave., Los Angeles 44, Calif.
Western Wire & Iron Works, Inc., 957 W. 18th Pl., Chicago 8, Ill.
Western Wire Products Co., 1415-35 S. 18th St., St. Louis 4, Mo.
● Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.
● Weston Electrical Instrument Corp., 619 Frelinghuysen Ave., Newark 5, N. J.
● Wheatland Tube Co., 1300 Bankers Securities Bldg., Philadelphia 7, Pa.
Wheelco Instruments Co., Harrison and Peoria Sts., Chicago 7, Ill.
Wheeler Mfg. Co., C. H., 1739 Sedgley Ave., Philadelphia 32, Pa.
Wheeling Machine Products Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling Steel Corp. Bldg., Wheeling, W. Va.
Whirlaway Motors, Inc., Tipp City, O.
White Flomatic Corp., P. O. Box 267, Hoosick Falls, N. Y.
White Mfg. Co., 2362 University Ave., St. Paul 4, Minn.
● White-Rodgers Electric Co., 1209 Cass Ave., St. Louis 6, Mo.
Whiting Corp., Harvey, Ill.
Whiting Stoker Sales Co., 11 S. La Salle St., Chicago 3, Ill.
Whitlock Mfg. Co., 100 South St., Hartford 2, Conn.
Whitney Chain & Mfg. Co., The, 237 Hamilton St., Hartford 2, Conn.
Whitney Mfg. Co., W. A., 636 Race St., Rockford, Ill.
Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill.
Whittaker Co., Wm. R., 915 N. Citrus, Los Angeles, Calif.
Whittington Pump & Engineering Co., 245 Meridian St., Indianapolis 4, Ind.
Whitty Co., Inc., 86 Western Ave., Boston 34, Mass.
Wickes Boiler Co., 502 N. Water St., Saginaw, Mich.
Wickes Bros., 500 N. Tilden St., Saginaw, Mich.
Wickwire Spencer Steel, Div. of Colorado Fuel & Iron Corp., 361 Delaware Ave., Buffalo 2, N. Y.
Wiedeman Machine Co., 4272 Wissahickon Ave., Philadelphia 32, Pa.
● Wiegand Co., Edwin L., 7610 Thomas Blvd., Pittsburgh 8, Pa.
Wiggins Oil Tool Co., Inc., E. B., 3424 E. Olympic Blvd., Los Angeles 23, Calif.
Wilbur & Williams Co., Greenleaf & Leon Sts., Boston 15, Mass.
Wilcolator Co., 1001 Newark Ave., Elizabeth B, N. J.
Wilhelm Co., A., 3rd and Bern Sts., Reading, Pa.
Will Corp., 35 Russell St., Rochester 3, N. Y.
Will-Burt Co., The, Orrville, O.
● Williams & Co., J. H., Buffalo 7, N. Y.
Williams Gauge Co., The, 1620 Pennsylvania Ave., N. S., Pittsburgh 12, Pa.
Williams, Inc., F. C., 6661 Chase Rd., Dearborn, Mich.
Williams Oil-O-Matic Div., Eureka Williams Corp., 1201 East Bell, Bloomington, Ill.
Williams & Son, I. B., Dover, N. H.
Williams Valve Co., D. T., Spring Grove Ave. & Township St., Cincinnati 25, O.
Williamson Heater Co., 4558 Marburg Ave., Cincinnati 9, O.
Willis Steel Corp., 156 N. Academy St., Galesburg, Ill.
Willson Products, Inc., 348 Thorn St., Reading, Pa.
Will-Weld Mfg. Co., Inc., 1533 Marcy St., Omaha 2, Nebr.
Wiley's Carbide Tool Co., 1340 W. Vernor Highway, Detroit, Mich.
● Wilson & Co., Inc., 4100 S. Ashland Ave., Chicago 9, Ill.
Wilson Co., H. A., The, 105 Chestnut St., Newark, N. J.
Wilson Co., K. R., 215 Main St., Buffalo, N. Y.
Wilson Engineering Corp., 122 S. Michigan Ave., Chicago 3, Ill.
● Wilson, Inc., Grant, 141 W. Jackson Blvd., Chicago 4, Ill.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York 17, N. Y.
Wind-Way Fan & Ventilator Co., 527 St. Joseph St., New Orleans 13, La.
● Wing Mfg. Co., L. J., 14th St. & 7th Ave., New York 11, N. Y.
Winkler & Sons, Inc., A. E., 2337 N. 31st St., Milwaukee 10, Wis.
Winslow Engineering Co., 4069 Hollis, Oakland 8, Calif.
Wiremold Co., The, Hartford 10, Conn.
Wiss & Sons Co., J., 33 Littleton Ave., Newark 7, N. J.
Witte Engine Works, Div. of Oil Well Supply Co., 1600 Oakland St., Kansas City 3, Mo.
Wittenmeier Machinery Co., 850-860 N. Spaulding Ave., Chicago 51, Ill.
Wodack Electric Tool Corp., 4627 W. Huron St., Chicago 44, Ill.
Wolfe-Kote Co., Inc., 820 Penn Ave., Sheboygan, Wis.
● Wolverine Tube, Div. of Calumet and Hecla Consolidated Copper Co., 1411 Central Ave., Detroit 9, Mich.
Wood Conversion Co., 1981 First National Bank Bldg., St. Paul 1, Minn.
Wood Steel Co., Alan, Conshohocken, Pa.
Wood's Sons Co., T. B., 1275 Fifth Ave., Chambersburg, Pa.
Worner Electronic Devices, Rankin, Ill.
● Worthington Pump & Machinery Corp., Harrison & Worthington Sts., Harrison, N. J.

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● Worthington Pump & Machinery Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
Worthington-Gamon Meter Co., Harrison, N. J.
Wright-Austin Co., 315 W. Woodbridge St., Detroit 26, Mich.
Wyckoff & Son Co., A., 100 Home St., Elmira, N. Y.

X

X L Refrigerating Co., 1834 W. 59th St., Chicago 36, Ill.
X Laboratories, Inc., 25 W. 45th St., New York 19, N. Y.
X-Pando Corp., 43-15 36th St., Long Island City 1, N. Y.

Y

Yale & Towne Mfg. Co., Stamford, Conn.
Yardley Plastics Co., 138 Parsons Ave., Columbus 15, O.
● Yarnall-Waring Co., 107 Mermaid Ave., Philadelphia 18, Pa.
● Yates-American Machine Co., Beloit, Wis.
Yeomans Bros. Co., 1433 N. Dayton St., Chicago 22, Ill.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.
● York Corp., Roosevelt Ave., York, Pa.
York Corrugating Co., Adams St. & W. M. R. R., York, Pa.
York Electric & Machine Co., 30-34 N. Penn St., York, Pa.
York-Heat Div., York-Shipley, Inc., P. R. R. & Jessop Pl., York, Pa.
York-Shipley, Inc., Industrial Div., York, Pa.
Yost Mfg. Co., Meadville, Pa.
Young & Bertke Co., 1004-1014 Hulbert Ave., Cincinnati 14, O.
● Young Radiator Co., 709 S. Marquette St., Racine, Wis.
Young Regulator Co., 5209 Euclid Ave., Cleveland 3, O.
● Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown 1, O.

Z

Zallea Brothers & Johnson, Taylor and Locust St., Wilmington 99, Del.
Zapon Div., Atlas Powder Co., North Chicago, Ill.
Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark 5, N. J.
Zenith Electric Co., 152 W. Walton St., Chicago 10, Ill.
● Zink Co., John, P. O. Box 310, Tulsa 1, Okla.

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